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PROMOTING SOURCE REDUCTION AND RECYCLABILITY IN THE MARKETPLACE:

A Study of Consumer and Industry Response to Promotion of Source Reduced, Recycled, and Recyclable Products and Packaging

September 1989

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I. Executive Summary

A. Introduction

Over the next ten years, Americans will generate enough municipal solid waste (MSW) to cover the District of Columbia in 77 feet of trash. At this rate, one-third of the nation's existing available landfill capacity will be exhausted in the next six years. Although the supply of adequate landfill capacity varies by region, EPA recognizes that the most important step in addressing the MSW management crisis is to reduce the amount of MSW destined for landfilling and incineration, and has established a national goal of 25 percent reduction in the amount of MSW disposed by 1992. Source reduction and recycling our waste materials are two ways to contribute to meeting this target. Source reduction activities include methods to reduce toxicity and volume of materials in products and packaging, extend product useful life, and reuse products and packaging.

A successful recycling program must include four stages:

1) the recyclable material must be recovered from the MSW waste stream;

2) the material must be delivered to a manufacturer for processing;

3) manufacturers must use reclaimed material in their production processes; and

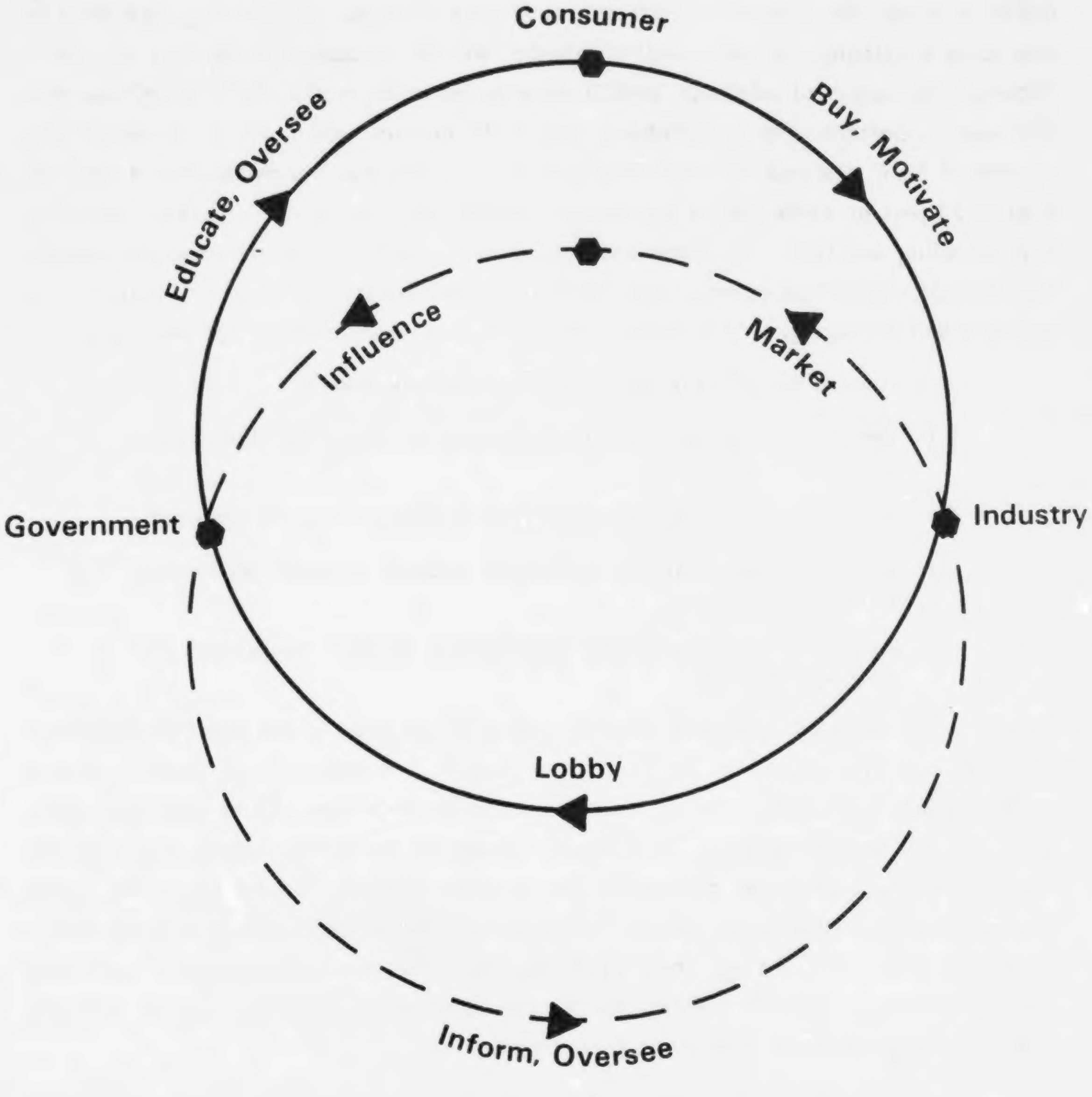
4) consumers must purchase the finished product containing the recycled material.

While all four steps are necessary for recycling to occur, most of the research and policy emphasis has been placed on the first three stages. For example, to conserve scarce landfill space, municipalities often collect recyclable materials such as aluminum cans, glass bottles, and newspapers. This report focuses on the fourth step by exploring the role of household consumer demand in the recycling process. In particular, the report reviews existing research, surveys, and existing consumer-oriented education programs to learn how consumers, through their purchasing decisions, can promote source reduction and recyclability. Exhibit 1 shows the general inter-relationships between consumers, industry, and government that affect consumer demand.

Unfortunately, the dearth of data and experience limit the ability to quantify the effectiveness of consumer-oriented education programs. The report does provide a convenient summary of existing information campaigns and research, and outlines some

Exhibit I.

Marketplace Inter-relationships Betweeen Consumers, Industry, and Government


Consumer
Buy, Motivate
Educate, Oversee
Influence
Market
Government
Industry
Lobby
Inform, Oversee

general principles contributing to successful consumer-oriented programs. The report is aimed at solid waste officials, consumer interest groups, manufacturers, and marketing consultants charged with developing strategies to reduce our MSW.

B. Major Findings

While solid waste officials confront tough MSW disposal decisions on a daily basis, consumer-oriented and marketplace initiatives promoting source reduction and recyclability offer innovative and long lasting solutions to the nation's MSW management crisis. A 1988 survey by the National Solid Wastes Management Association (1988a) found that Americans ranked garbage disposal second only to improving education as the most serious problem facing local officials. In a recent Gallup poll, fifty percent of Americans stated that they would change their purchasing habits to buy foods and beverages that are sold in recycled or recyclable containers (Modern Brewery Age, 1988). In addition, ninety percent of the 1,000 respondents to an October 1988 survey felt that recycling and biodegradability will help alleviate the solid waste problem (Robert Marston and Associates, 1988). (Also, see Erickson (1988) and Resource Recycling (1986) for similar consumer support for purchasing recycled and recyclable packaging materials.) This change in attitudes since the early 1980s reflects an increased awareness and concern for the environment. As noted by Geller (1986), increased consumer awareness of environmental problems, generated by national media coverage of incidents such as the odyssey of the Islip, New York garbage barge and their relationship to purchase decisions, bodes well for the success of future consumer education campaigns related to this issue.

This study found several consistent themes in the projects and research reviewed, and identified strategies that can be successful in stimulating household demand for products and packaging that promote source reduction and recyclability. For example, the general principles listed below were shown to enhance the effectiveness of consumer-oriented programs designed to promote source reduction and recyclability:

- Attention-getting techniques for education programs must compete with other advertising. To be successful, educational programs must be of high quality and as sophisticated as other advertising in targeting appropriate messages to various audiences.

- Long-term changes in consumer behavior depend upon changing basic consumer attitudes and motives. Consumer education programs should not be limited to short-term, non-durable incentives, but should be combined with self-sustaining motivation (having long-term durability).

- Household consumer awareness programs should make consumers feel that their participation will be a positive contribution to the solution of an important problem.

- In order to increase product choices available to consumers, upstream decision-makers such as marketers, manufacturers, and product designers must be educated about the desirability and advantages of source reduction and product/packaging recyclability, as well as the economic and image enhancement.

- Definitions, labeling, and other important messages must be standardized, simple, and well publicized, so that they are readily recognized and understood by consumers.

C. Program and Policy Needs

Continued research is essential to determine the effectiveness and impacts of programs and strategies designed to increase consumer demand for products and packaging that will help mitigate the MSW management crisis. In addition, the success of intervention programs and strategies will be enhanced if governments, consumer groups, industry, and retailers develop supporting activities. Additional research and program development is required in the areas described below. (This discussion is expanded in Section VII.)

Provide technical guidance/information dissemination. This task can be addressed by establishing a clearinghouse, providing a hotline service, and promoting policy debates and program initiatives in forums such as trade association meetings, technical journals, and conferences. These activities can provide information appropriate to different audiences, such as:

- solid waste officials (e.g., guidance documents for national, state, or local consumer education and environmental awareness campaigns, cost and performance information on materials, procurement transactions, advertising campaigns, environmental shopping databases, and a database of legislative activities);

- state and local governments and groups (e.g., guidance documents on how to increase local awareness of the MSW management crisis as well as effective activities to stimulate consumer demand for products and packaging promoting source reduction and recyclability);

- the general public (e.g., information on buying source reducing or recycled products and packaging). Public awareness efforts, such as the "Gray is Beautiful" campaign sponsored by the American Paper Institute, complement public sector and public interest programs; and
- industry (e.g., cost and performance information on materials, procurement standards, update of Federal activities and procurement transactions).

Develop and adopt standardized definitions. Without standardized labeling, "contains recycled material" and "does not damage the environment" claims may become overused and, in many cases, misleading. Consistent definitions will help solid waste officials, industry, and consumers to understand the difference between products and packaging that can mitigate the solid waste crisis and those that do not.

Develop labeling requirements and standards based on national consensus. Use of environmental logos, symbols, and labeling (e.g., "made from recycled material," "recyclable") in advertising and product and packaging promotion should be based on establishing requirements and standards for their use. Such actions will maintain the integrity of labeling claims. For example, a simple label, such as "environmentally friendly," may be preferable to specific terminology referring to recycled content or toxicity, but the label needs to be uniformly understood. The most commonly used symbols associated with recycled content are shown in Exhibit 2.

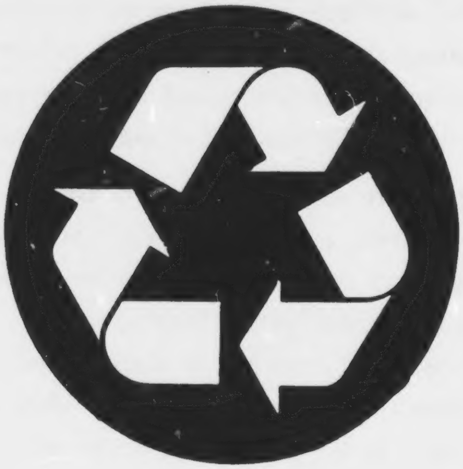
Support community-based pilot projects. Community or state pilot projects (especially if done on a comprehensive scale) can be used to demonstrate the feasibility of, and gain acceptance for, consumer education programs and other social marketing techniques that increase consumer awareness and encourage participation of state solid waste management offices, municipal officials, businesses, and households. Focus groups (including representatives from consumer groups, industry, government, and research organizations) may be appropriate for designing pilot projects and getting key players to participate.

Support economic and technical research. While some people will readily accept products with recycled content, further research may be needed to demonstrate to a wider constituency that "buy recycled" and related programs benefit society as a whole and that the cost of environmental impacts resulting from MSW disposal is paid for by each of us. This research might support economic studies to determine the social and community impacts of changes in consumer habits on the standard of living. Other

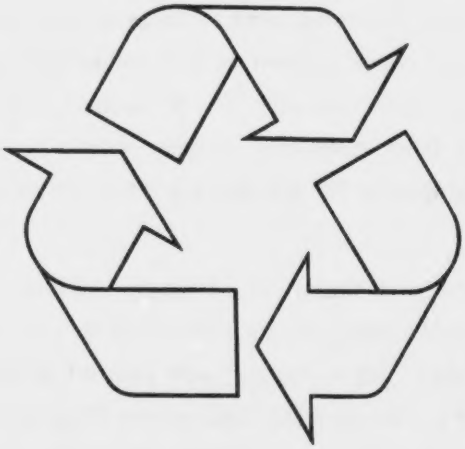
Exhibit 2.

Recycled/Recyclable Logos

Many companies which package their products in recycled paperboard use the recycling symbol to indicate that the carton is *made* from recycled paper.



Companies producing paper products that *are* recyclable use the reverse of this symbol.



research might include the effectiveness, appropriate levels, and targets of economic incentives and disincentives, and development of innovative or existing reclamation and recycling technologies.

Support socio-behavioral research. The relationship between consumer education efforts and changes in purchasing decisions is complex and not fully understood. Further research in this area will give industry, government, and consumer groups a better understanding of how to design strategies to promote source reduction and recyclability of products and packaging. Examples of research include determining: ways of using informational strategies to promote intrinsic motives to conserve; ways of combining intrinsic and extrinsic motives to produce more durable behavioral change; what variables, not directly related to attitudes, affect consumer behavior; and the possibility of an increase in consumers' quality of life from adopting environmentally-appropriate behavior.

Facilitate interaction between consumers and industry. All levels of government could enhance the feedback loop between consumers and manufacturers/product designers. Focus groups might alert industry to the product and packaging concerns of a community or market segment and permit them to respond proactively to consumers' concerns.

Foster data collection. Tracking industry's use of recycled materials through the U.S. Department of Commerce's Annual Census of Manufacturers could provide valuable information on existing practices and the success of various initiatives attempting to encourage the use and purchase of recycled materials.

II. Background

A. The Municipal Solid Waste Management Crisis

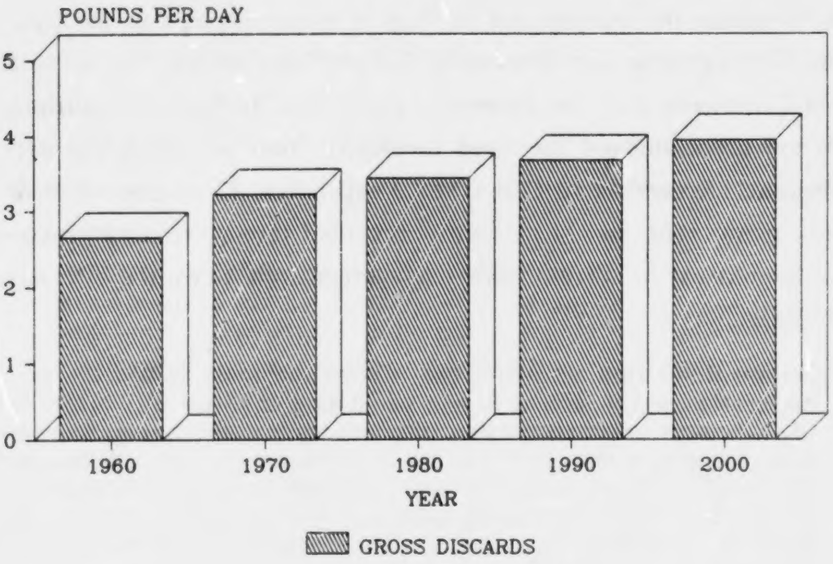
In 1987, the town of Islip, New York found that a barge hauling its trash up and down the East Coast had become a regular feature of the national news. However, the problems that Islip was experiencing in disposing of its solid waste were by no means that unusual. Consumption of manufactured and processed goods inevitably generates waste. Each year Americans throw away an increasing amount of materials, while at the same time the nation's landfill disposal capacity is decreasing. If this trend continues, not only towns but cities, regions, states, and the nation as a whole will be confronting serious municipal solid waste (MSW) disposal problems in the coming years. New York State, for example, currently generates 20 million tons of MSW each year. According to the New York State Legislative Commission on Solid Waste Management (1988), all 241 of the state's active landfills will reach their capacity and close by 1995 unless the generation rate of MSW is curbed. To add to the state's planning problems, only one new landfill site has opened since 1986.

On the national level, MSW problems are equally daunting. In 1988, over 1,300 pounds of MSW, between three and four pounds per day (Exhibit 3), were generated by each American; population growth in the United States will further exacerbate the MSW management crisis. As shown in Exhibit 4, the total amount of MSW generated annually is expected to increase by 20 percent to 193 million tons by the year 2000 (USEPA, 1988a). At this rate, the EPA estimates that nearly one-third of the nation's MSW landfills will be full within six years (Porter, 1988). This lack of adequate disposal capacity, coupled with increased solid waste generation and rapidly rising disposal fees, form the crux of the MSW management crisis.

New disposal facilities (i.e., landfills and incinerators) often face considerable public opposition because of real or perceived public health threats (Michaels, 1988). While local opposition is a major obstacle to siting new MSW disposal facilities, public concern is not limited to issues of health risks associated with disposal facilities. Increasingly, the American public is thinking about a broader range of environmental consequences resulting from the manufacture or disposal of products that they purchase and the problems of MSW disposal. These environmental consequences include beach and ocean litter, depletion of natural resources, impacts on wildlife and aquatic ecosystems (e.g., ingestion of plastics by marine life), crop damage, and the human health impacts of landfilling and incineration of MSW.

Exhibit 3.

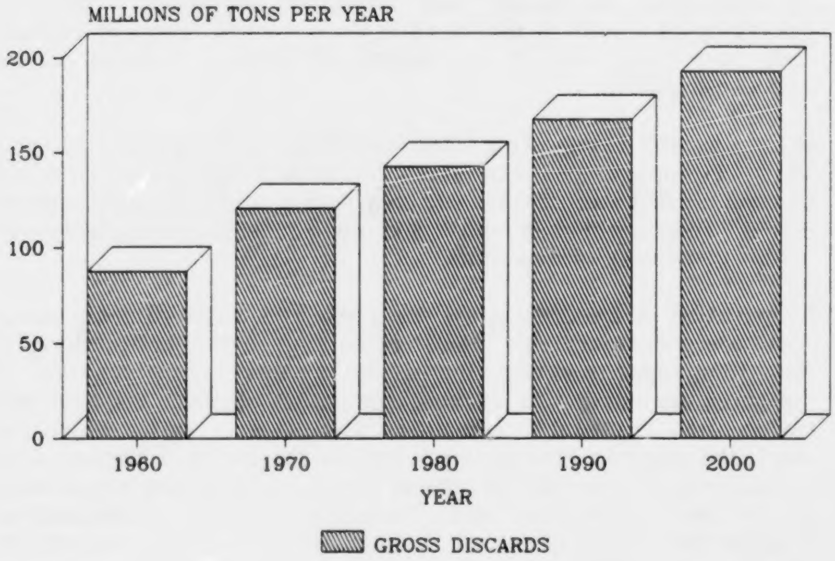
Quantity of MSW Per Person Per Year



(U.S. EPA, 1988a)

Exhibit 4.

Total Quantity of MSW Per Year



(U.S. EPA, 1988a)

B. Looking for Solutions

MSW disposal has become a significant local and regional problem and a growing number of communities face a crisis of what to do with today's and tomorrow's trash. In light of the MSW management crisis, the EPA is interested in examining a number of strategies to reduce the amount and toxicity of waste disposed in the U.S. On April 13, 1988, then Administrator Lee Thomas (1988) testified before the House Committee on Energy and Commerce that the Agency is committed to "holistic solutions to our waste problems" and acknowledged the need to depart from our historical dependence upon landfill disposal. According to EPA (1988a) estimates, 83 percent of MSW is landfilled, 6 percent is incinerated, and 11 percent is recycled through material recovery or energy programs. In contrast to current MSW management practices, the EPA has established a preferred hierarchy:

1) **Source Reduction** activities can reduce the toxicity and the amount of materials used in products and packaging that are ultimately disposed of. Through improved design of products and packaging, source reduction prevents waste from having to be managed. Household consumers can influence manufacturers' and packagers' source reduction activities by preferentially purchasing products and packaging that contain less material, last longer, or are less toxic than conventional products and packaging. In addition, repair and renovation improve a product's longevity and reduce demand for new products.

   Reuse of packaging and other "disposable" goods also enhances source reduction goals by lowering demand for, and consumption of, virgin materials. Each time a good is reused, a new one need not be manufactured, purchased, and ultimately disposed. Products and packaging designed to be reusable do not need frequent replacement and, over time, should not create as large a disposal problem as disposable goods.

2) **Recycling and Composting** (later referred to collectively as recycling) are MSW management techniques that reduce the amount of waste sent to landfills and incinerators (thereby saving waste disposal capacity and perhaps reducing human health and environmental risks), and contribute towards recovery of materials.

3/4) **Incineration or Landfilling** are the preferred waste disposal techniques that are necessary for MSW remaining after undertaking source reduction, reuse, and recycling to the greatest extent possible. Proper measures are needed to increase the safety of these disposal methods. Incineration is useful in reducing the volume of waste which must be landfilled and can also generate usable thermal and electrical energy. Landfilling is essential to handle non-recyclable and non-combustible wastes and incinerator ash. However, current overdependence on landfills for management of over 80 percent of the nation's MSW is quickly exhausting the existing capacity of this disposal method.

EPA's previous Administrator stressed that policy solutions and programs "at the front end of the process" should focus on preventing or minimizing the introduction of wastes (Thomas, 1988). Each year, millions of tons of MSW are incinerated or landfilled that could otherwise be reclaimed and recycled. Exhibit 5 illustrates that paper and paperboard and yard wastes account for almost 60 percent of MSW. Programs designed to promote source reduction and recyclability of these materials could result in large reductions in the quantity of MSW disposed. More generally, source reduction, reuse, and recycling will reduce the amount, and, in some cases, the toxicity of MSW destined for incineration or landfilling and will extend the useful lives of existing landfills, delay the need for construction of new disposal facilities, reduce the potential for environmental damage from disposal, save energy, and reduce depletion of renewable and non-renewable resources.

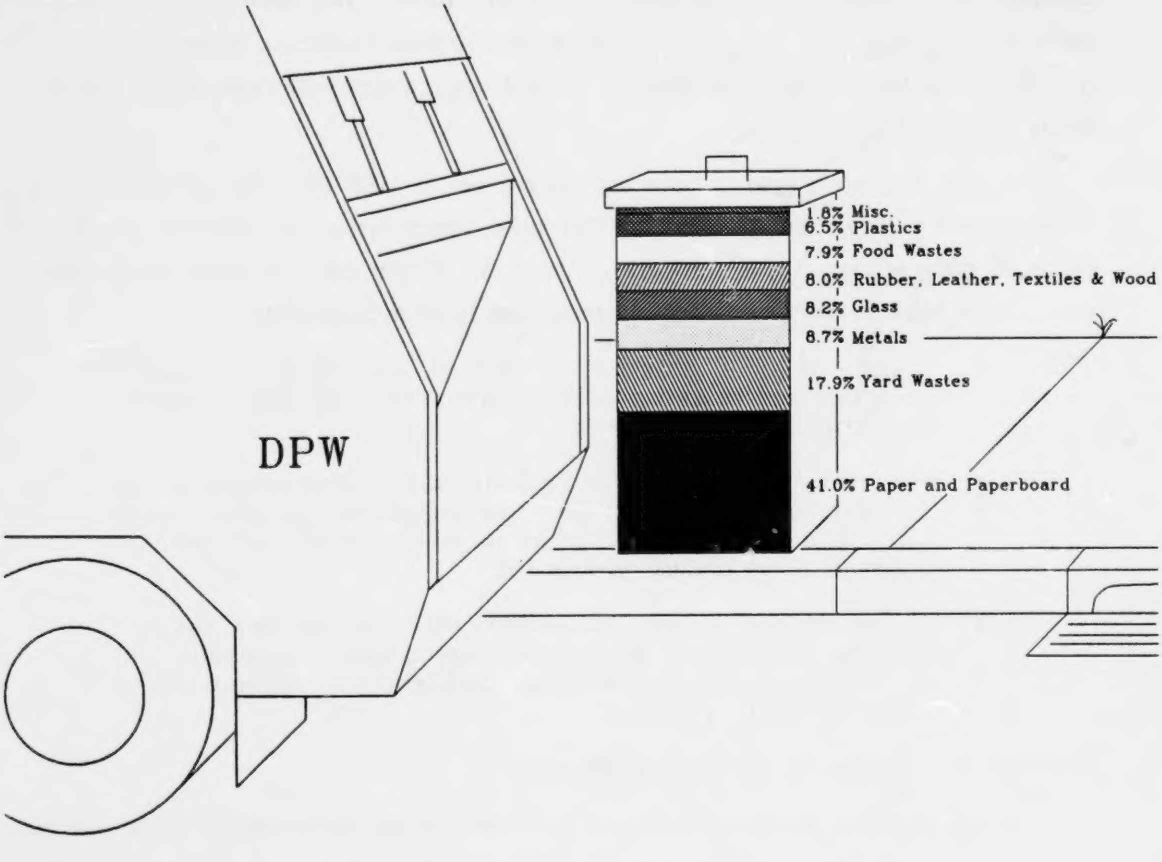
EPA has set a goal of reducing the amount of MSW destined for landfilling and incineration by 25 percent by 1992. While some source reduction and recycling already occur in many communities throughout the U.S., if the national goal of 25 percent reduction in MSW is to be met, the following need to be accomplished:

- Local and state governments need to actively pursue source reduction and recycling with requirements, voluntary measures, incentives, and disincentives;
- All levels of government and industry will have to work together to encourage markets for source-reduced, recycled, and recyclable goods (e.g., minimum recycled content requirements for government procurements); and
- Household, government, and industry attitudes and behaviors will have to change in order to encourage greater availability and increase purchases of products and packaging that promote source reduction and recyclability.

It is this last point that is the focus of this report.

Household consumer purchase of products and packaging that promote recycling can help to close the recycling loop by increasing demand for recycled or recyclable materials. Purchase of these types of products and packaging helps to mitigate the MSW management crisis by stimulating markets for recycled materials and reducing the amount of MSW disposed.

Exhibit 5
Constituents of the MSW Stream



(U.S. EPA, 1988a)

In 1988, almost half of surveyed American consumers claimed that they "often" or "sometimes" considered the recyclability of packaging material when making a product purchase decision (Erickson, 1988). Stronger markets for these products and packaging will in turn encourage greater supply of these goods from manufacturers and greater recovery of materials from the MSW stream. Cutler (1988) asserts that mandatory source-separation programs will not provide large-scale solutions to the MSW management crisis until stable markets for recycled products are created. In other words, recovering materials from the MSW stream will do little good until there is a demand for the products they are used to create.

In addition, household consumer purchase of products and packaging that promote source reduction can lessen the amount of this material in the waste stream, or lower the toxicity of wastes, and ultimately reduce the adverse environmental impacts of MSW disposal.

C. Study Description

A key task of this study is to summarize the relevant studies, research, and educational programs related to household consumer demand for products and packaging that promote source reduction and recyclability. To this end, this report reviews previous studies, research, surveys and other relevant information on approaches to increase household consumer demand for products and packaging which either promote source reduction (i.e., are less wasteful, more durable, or less toxic than conventional products and packaging, or are reusable) or promote recyclability (i.e., contain recycled materials or are recyclable).

This report also categorizes successful features of education programs designed to promote consumers' awareness of the environmental consequences of their purchase decisions. By environmental consequences of purchase decisions we mean the environmental impacts associated with the manufacture, use, or disposal of purchased products and packaging. The study focuses on educational campaigns designed to increase consumer awareness of such environmental consequences. The report also discusses the factors that influence consumer responses to programs designed to stimulate demand for these products. Obviously, the consumer product marketing factors characterized as the four P's -- product (e.g., quality), place (e.g., availability), promotion, and price -- are principal determinants of consumer demand (McCarthy, 1975). Finally, the means by which consumer groups, governments, and industry (including marketers and retailers) can influence the marketplace to increase the availability and use of products and packaging that promote source reduction and recyclability are examined. A comprehensive national strategy which includes both educational programs and market-based efforts could aid in attaining the national MSW source reduction and recycling goal by 1992.

D. Limitations of the Study

The findings of this study are primarily intended for use in designing future programs targeted towards households and consumers. Therefore, the project scope was limited to products and packaging that are available to household consumers and does not necessarily apply to commercial products such as building materials. Because of the interrelationships among product and packaging availability, economies of scale in production, and social trends, a wide variety of industry and governmental activities should also be considered part of the nation's comprehensive MSW reduction policy.

III. Discussion and Results

This section presents findings based on a survey of relevant literature and on informal telephone interviews with experts in the field (see Appendix B). The interviews provided information on current activities and program experience, both published and unpublished. Key factors influencing the success of programs and projects designed to stimulate consumer demand for products and packaging that promote source reduction and recyclability are discussed in the following three subsections. Section IV includes a discussion of factors which affect the likelihood of success of household consumer education programs. (Several more general guidelines for education programs are found in Section VII.) In order to actively change purchase decisions, program planners and manufacturers must understand the varied responses of households to the awareness of the environmental consequences of their purchase decisions. Section V introduces the marketplace relationship between consumers and product and packaging marketers and manufacturers. This is followed by a discussion in Section VI of how governments, consumer groups and industry can influence consumer demand for products and packaging promoting source reduction and recyclability. Appendix A provides summaries of most of the references used in this report. Organizations and individuals contacted for this study are listed in Appendix B. Appendix C provides background information on constituents of the MSW stream and opportunities for source reduction and recycling.

There are four general approaches to stimulating consumer demand for products and packaging that promote source reduction and recyclability:

Household consumer education depends primarily on intrinsic rewards for altering purchase behavior. A wide range of programs fall under this category; they vary according to their goal, audience, and targeted behavior. A short list includes: "buy recycled" environmental shopper programs for households, product or shelf labeling programs at the retail level, environmental awareness programs for the community, and school-based awareness programs and activities. Geller and Lehman (1986) found that education programs alone will not change consumers' purchasing decisions.

Marketplace initiatives, for the most part, are under the control of industry decision-makers. However, they are also influenced by consumer activism and social trends. These initiatives can lead to a change in the availability and price of products and packaging. Some marketers already promote their products and packaging as having fewer environmental impacts (e.g., containing recycled materials, thereby reducing the consumption of virgin materials and disposal of post-consumer materials) and others may be influenced to follow if the promotion increases a product's competitiveness in the marketplace. Consumer activism may take the form of selective buying campaigns, letter writing campaigns, or, in some cases, product boycotts. As society becomes increasingly aware of the environmental consequences of purchase decisions, product manufacturers and packagers may be encouraged to respond.

Economic incentives or disincentives can create an extrinsic reward to increase purchases of products that have fewer adverse environmental consequences, or impose a penalty for purchase of environmentally undesirable goods. Economic incentives for manufacturers and households include subsidies, rebates, and credits for manufacturing or purchasing products and packaging that promote source reduction and recycling. Policies that could provide economic disincentives to manufacturers and household consumers include taxes on virgin materials (or a tax exemption for products or packaging using recovered materials) and taxes on the type and amount of packaging material at the point of manufacture or sale and pay-per-container charges (Riggle, 1989; and Sproule and Cosulich, 1988). In general, incentives and disincentives targeted at the manufacturer level appear to be a more direct approach to promote source reduction and recycling.

Mandatory requirements and restrictions, by definition, stipulate that certain choices such as purchase of source reduced goods or goods containing recycled materials must be undertaken by those individuals, communities, governments, and industries subject to the requirements. Requirements and restrictions may be turned to if markets for recycled materials are not developed or manufacturers or consumers do not respond favorably. Such requirements or restrictions on product or packaging content or availability applied at the retail level can affect household purchase decisions. For example, a government authority may implement a program where products or packaging are reviewed and approved for use by an oversight group. The major advantage of mandatory requirements is that participation rates may be higher than in most voluntary programs. The public may, however, react negatively to required changes.

This study examines how voluntary efforts, such as household consumer education and certain marketplace initiatives can be used to alter consumers' purchase behavior. Economic incentives and disincentives and mandatory requirements can also be used to change product and packaging availability and composition but are not examined in detail in this study.

IV. Factors Influencing the Success of Consumer Education Programs

Several factors were found to affect the success or failure of educational and social marketing programs designed to stimulate consumers' demand for products and packaging that promote source reduction and recyclability. Consideration of these factors can help in the design of successful consumer education programs. The factors, though not always mutually exclusive, include:

- consumer awareness of the MSW management crisis and environmental consequences of purchase decisions;
- content and quality of consumer education and promotional activities;
- involvement of different interest groups; and
- development of consumer education programs designed for the long term.

The discussion of these factors is followed by an evaluation of the competitive forces in the retail marketplace and how these can be used to stimulate consumer demand. Underlying the success of these programs is the availability of products and packaging included within the education program. These and other marketing factors, discussed in Sections V and VI, will determine what options are available to consumers in the marketplace.

A. Level of Consumer Awareness of MSW Management Crisis and Environmental Consequences of Purchase Decisions

The success of an educational program designed to change consumer buying habits to purchase products and packaging promoting source reduction and recyclability depends in part on generating and maintaining a high level of awareness about the MSW management crisis and the environmental consequences of household consumer purchasing decisions. Without this knowledge, individuals have little motivation to change their behavior (Taylor, 1988; and Tracy and Oskamp, 1984). Tracy and Oskamp (1984) found that individuals and households often lacked knowledge of what they could do to avoid environmental problems. In this case, lack of knowledge of the environmental impacts of household activities caused lower rates of participation in ecologically responsible behavior. Kinnear and Taylor (1973) measured the association between ecological concern and product brand perception using statistical analyses of consumer responses to questions about brand preferences and environmental concerns. They determined that consumers who were aware of the impacts of phosphates on the environment viewed laundry detergents containing phosphates as contributing to the pollution of lakes and streams. Low- or non-phosphate detergents were seen as helping to mitigate the problem of water pollution. These observations suggest that generating awareness of, and concern for, environmental issues will add another dimension to consumer purchasing decisions. Young and Storey (1988) recently found that education can be effective in raising citizens' awareness of the need to minimize waste generation.

Education Methods - Programs aimed at generating higher levels of consumer awareness of the MSW crisis and the environmental consequences of purchase decisions take many forms, such as leaflets, brochures, and booklets written and distributed by industry, retailers, academia, community, state, and national groups, as well as public service spots and news coverage on both radio and television. These programs typically inform the target audience about the MSW management crisis and its causes, and tell how they, as consumers, can adjust their product and packaging purchasing, usage, and disposal habits to lessen the environmental consequences. Each type of program has its own set of strengths and weaknesses. Because brochures available upon request usually reach interested and informed consumers (those willing to make the effort to pick up a brochure), the information they contain may be more detailed. Fliers and pamphlets inserted with other mailings, such as a utility bill, will get into many more households but must be eye-catching and should contain a simpler message. Larson and Massetti-Miller (1984) determined that sole reliance on mass-media channels was not effective in changing recycling behavior. Taylor (1988) found that publicity of local problems and changes in local waste collection practices produced the greatest awareness in solid waste problems. Publicity of a national problem produced "moderate" awareness, while regular news coverage generated no awareness.

A variety of promotional and informational materials have been developed which address source reduction/reuse/recycling (API, 1988; EDF, 1988; Hurst and Relis, 1988; MDNR, 1988; PRC, 1988; USEPA 1988b, 1979; CFE, 1987; Brandt and Swanson 1984; EAF, 1980s; and League of Women Voters, 1975, 1972), packaging (City of Berkeley, 1980s; EAF, 1980s; SED, 1980s; ODEQ, 1980; and USEPA, 1976), and household hazardous wastes (EFE, 1988; CPCB, 1986; Chown and Fridgen, 1986; HPDC, no date; and MDEM, no date). The recycling/reuse pamphlets describe the benefits of recycling and reuse (e.g., conserving raw materials and reducing disposal costs) and urge readers to participate in ongoing recycling programs or to try to start one in their own communities. Other pamphlets included in this review describe how, oftentimes, products are overpackaged and suggest what consumers can do to minimize buying excess packaging. Identification of less toxic substitutes and appropriate disposal techniques for household hazardous wastes (with a list of do's and don't's) are the subjects of the pamphlets (referenced above) addressing household hazardous wastes. In addition, Dadd (1984) has compiled a listing of non-toxic alternatives to many products in Nontoxic and Natural. No information was uncovered that described the effectiveness of these materials in raising consumer awareness and changing purchase behavior. The importance of properly evaluating promotional materials is discussed in Section IV.D.

Education Programs - "Environmental shopping" campaigns have made efforts to increase consumer awareness of the MSW management crisis and the environmental consequences of purchase decisions and solid waste disposal. Awareness of environmental issues has been generated by various groups using in-store posters, promotional announcements, brochures, and press releases (e.g., API, 1970s-1980s). For example, a survey conducted after an environmental shopping campaign in the Von's grocery store chain found that 71 percent of the respondents from the stores in which the campaign had been active agreed that there was a garbage crisis in California. Only 51 percent of the survey respondents from the stores which did not participate in the awareness program felt that there was such a crisis (PRA, 1981). This campaign was expanded throughout the San Diego area and similar campaigns have been conducted in Palo Alto, California, and Milwaukee, Wisconsin (Gallager, 1984; Conservation News, 1976; EAF, 1976; Red Owl Stores, 1973; PAMRRP, 1970s; and USEPA, 1970s).

Educating children (i.e., future consumers) may be a key to longer-term success of any program. According to O'Leary and Walsh (1988), there are curricula available that teach children about waste generation, the environmental problems that can result from waste disposal, and the benefits of recycling. These programs can have a dual effect in that the children grow up with this environmental awareness and also pass on what they have learned to their parents. Several programs targeted at elementary and high school students in Florida, Missouri, Ohio, and New York City, promote an awareness of recycling and other aspects of waste disposal (Browne, 1988) (also, see Bell and Schwartz, 1989; NJDEP, 1989; and USEPA, 1980). Mikitka (1985) proposes that school-based curricula be developed which complement and strengthen environmental shopping campaigns in the community.

Education activities should also include the wide range of professionals involved in the recycling loop. Such groups include consumers, procurement specialists, MSW management officials, marketers, and product and package designers/manufacturers.

Targeting Education Programs - A key element of widespread consumer acceptance and program success is a solid understanding of the consumers whom the program is seeking to influence. Educational campaigns should tailor promotional messages to fit each of the different groups that their programs seek to reach. One California survey found no significant difference in recycling rates between social classes; however, the reasons for participation varied among the groups. It found that individuals with higher incomes are more likely to recycle for ecological reasons and individuals with lower incomes are more likely to recycle for economic or monetary reasons (Mikitka, 1987). Similar purchasing preferences were revealed in a 1988 Gallup poll in which 60 percent of Americans with incomes over $40,000 said that they would switch to a product in a recyclable container if offered the choice (Modern Brewery Age, 1988). It follows that program organizers need to know the audience to which they wish to appeal. Strategic preliminary research is necessary for a program to target the appropriate message effectively towards several different audiences.

The importance of effective targeting is emphasized by Geller (1989), who states that behavior-change strategies work best when they are aimed at specific, carefully defined behaviors. Targeting allows for more effective reinforcement of desired behavior changes because incentives and disincentives, rewards and punishments, can be tailored to the behavior. For large-scale programs, Geller and Lehman (1986) conclude that a program using a diverse set of strategies to induce (e.g., rebates for returning recyclables) and promote (e.g., public service announcements touting the social benefits of participating) desired behaviors (e.g., buying products and packaging that promote source reduction or recyclability) are more likely to be successful because each person responds to a different stimulus. However, it needs to be pointed out that there may be a discrepancy between attitudes/preferences and actual behavior (Geller, 1981).

Because of the expected link between awareness of the MSW management crisis and greater consumer demand for products and packaging that promote source reduction or recyclability, future pilot programs designed to influence consumer purchasing habits might be most successful if they are aimed at areas where consumer awareness of environmental problems is already high but where relatively little consumer education to change purchasing habits has occurred. States such as New Jersey and Connecticut have imposed deadlines (1989 for New Jersey, and 1991 for Connecticut) requiring each disposal area (town, city, or county) to recycle 25 percent of its trash (Mattheis, 1987, and CFE, 1987, respectively). Such legislation, as well as the public debate surrounding solid waste issues, generates greater community awareness of the MSW management crisis so that an education program will not have to devote as much time, money, and effort convincing consumers of the benefits in changing their purchase decisions. Other communities which might make good hosts to future demonstration projects (e.g., an environmental shopping campaign) would be those that have developed strong voluntary recycling programs. Mary Shiel, head of New Jersey's Office of Recycling, said that without widespread awareness of the state's solid waste disposal dilemma generated by voluntary recycling programs at the municipal level, introduction of the State's mandatory recycling program would have created chaos (Mattheis, 1987). Eco-Haul, a Californian recycling company contracting to city and county sanitation departments, has pioneered many recycling programs, some of which have been in existence for over 12 years (Salimando, 1986). In these cases, community groups and industries already have done much to raise public awareness, a key to changing consumers' behavior and program success (Mattheis, 1987; Salimando, 1986; and API, undated).

Recent developments suggest that social marketing efforts to promote recycling are becoming more widespread and sophisticated. The Environmental Defense Fund, with the co-sponsorship of the National Ad Council and co-funding from U.S. EPA and several states, launched a nationwide advertising campaign to promote recycling. In addition, EDF has met with script writers of major television programs to try to convince them to insert recycling activities into their programs (Ferrand, 1988c). On the other hand, De Young (1987) conducted a survey among Michigan residents and found that changing attitudes should not be so heavily emphasized in the state's resource recovery programs since so many respondents already considered recycling to be important.

Behavioral Considerations - It is important to note that changes in awareness of the MSW management crisis do not necessarily result in changes in consumer attitudes or behaviors. Geller and Lehman (1986) claim that general informational pamphlets alone are not effective in changing behavior (concerning energy conservation), but when combined with extrinsic incentives or disincentives, such as credits or taxes, they improve the likelihood that consumer habits will change. De Young (1985-1986) found that much of an individual's everyday conservation behavior was intrinsically motivated, and that a program should not invest all of its effort in developing extrinsic incentives but rather should focus on enhancing people's discovery of these internal motives.

B. Content and Quality of Consumer Education and Promotional Activities

Before embarking on a new consumer education program, designers and organizers should determine what tools are already available to them, what methods have been used elsewhere, and research the successes and failures of previous programs. As one publication advises, "don't waste your energy reinventing the wheel" (Enterprise for Education, 1988).

Numerous publications and materials have been designed to assist in the development and implementation of consumer education programs. These include: pamphlets and books on such topics as public access to radio and television; strategies for approaching the media and for raising money; educational slide shows on the MSW management crisis; source reduction or recycling activities; posters about recycling and environmental shopping; and T-shirts imprinted with the recycled/recycling symbol. The St. Louis County (Minnesota) Health Department developed a twenty-minute slide and tape show describing how consumers, governments, and community groups can work together to help solve MSW management problems (Brandt and Swanson, 1984). Informational pamphlets and materials have been developed by a wide variety of groups dedicated to finding solutions to the MSW management crisis. These include state solid waste agencies, such as the Michigan Department of Natural Resources (1988), Pennsylvania Resources Council (1988), Seattle Engineering Department (1980s), and the Oregon Department of Environmental Quality (1980), Federal agencies, such as the U.S. Environmental Protection Agency (1988b, 1976), and interest groups, such as the Council on Economic Priorities (1988) and the National Solid Wastes Management Association (1988a, b) and Enterprise for Education (1988).

Several key characteristics determine how consumer education programs are received by their audience, and are considered below:

- content of program;
- simplicity, convenience, and quality of program;
- tone of message; and
- timing of program.

Content of Program - A key component for education programs to encourage recycling or other resource conservation behavior is to provide information -- e.g., what to do, how to do it, where to do it (De Young, 1987; and Conn, 1980). Furthermore, small initial commitments to purchase products and packaging promoting source reduction and recyclability may be more effective in starting, sustaining, and expanding this behavior (Katzev and Pardini, 1987-88; Stern, 1984; and Pardini and Katzev, 1983-84).

Targeted strategies designed to change consumer behavior, as well as purchase decisions, are more likely to gain widespread consumer acceptance and to produce lasting changes in buying habits than are programs that focus solely on attitudes (Geller, 1986). Geller et al. (1983) and Geller (1981) contend that education and feedback techniques should be combined with rewards to promote high participation rates in resource conservation.

An important element in attitude-change strategies is intrinsic motivation. According to De Young (1984), individuals are more likely to continue intrinsically motivated behaviors because they feel that the behavior is worthwhile "for its own sake," and not necessarily because any rewards could be gained. De Young also argues that recycling programs are too often designed solely around economic (i.e., extrinsic) incentives, and that programs combining extrinsic and intrinsic incentives could achieve more effective and enduring results. After incentives are removed, individuals may return to their previous behavior (Katzev and Pardini, 1987-88; De Young, 1984; and Pardini and Katzev, 1983-84). Furthermore, over-reliance on incentives may make consumers overlook their intrinsic motivations (De Young, 1984).

Beyond convincing consumers that their individual actions can be effective, education programs need to dispel misconceptions, such as inferior quality, about recycling. Marketers do not typically promote the recycled material content in products and packaging if they expect consumer preference for non-recycled materials. Public opinion polls, however, indicate that as many as one half of American consumers would prefer to buy foods and beverages in containers that are, or can be, recycled (Modern Brewery Age, 1988). Similar results are reported in Erickson (1988), Robert Marston and Associates (1988), and Resource Recycling (1986). However, as noted earlier, there may be a discrepancy between individual attitudes/preferences and actual behavior (Geller, 1981).

Simplicity, Convenience, and Quality of Program - Both the message to consumers and their desired behavior changes must be simple and readily understandable. If consumers and store personnel cannot quickly and easily understand a program, or if the program requires consumers to alter their shopping behavior significantly, the program becomes a burden and may be ignored or rejected. The experience of one food store chain illustrates this problem. In 1973, the Red Owl stores in Wisconsin initiated a program to encourage consumers to reuse containers (Conservation News, 1976; EAF, 1976; Red Owl Stores, 1973; and USEPA, 1970s). The stores promoted the program using posters and mentioned the program on their regular newspaper advertisements. Consumers were given small cash refunds at checkout for refilling paperboard egg cartons, plastic milk bottles, and plastic soda bottles, and for reusing paper and plastic grocery bags. However, among other problems, store workers had difficulty keeping track of all of the reused containers, and consumers often forgot to bring containers back to the stores.

De Young (1987) asserts that future education programs should devote more time to help people overcome perceived barriers to recycling, encouraging consumers to convert good intentions to actual behaviors. Taylor (1988) found that where public awareness programs for recycling were poorly run, households were confused and uncooperative.

Research suggests that simplicity and convenience are largely matters of perception. For example, Crosby and Taylor (1982) found that after participating in a recycling program for a few months, consumers began to consider the program more convenient and less burdensome than when it began. The authors state that as a new behavior is learned and becomes more efficient, "[i]t will tend to be perceived as more convenient." One goal of start-up programs is to keep consumers participating long enough for this to happen. Fountain Fresh Beverage Company operates in-store bottle washing and refill units for soft-drinks. The company reports that consumers have responded positively to the program, with some even attracted by the novelty of the product (Stone, 1988).

Tone of Message - The message that a consumer education program presents should be positive. For example, "We can do it!," or "Be a part of the solution," or "You can help," are more enticing than reprimands such as "Quit your wasting!" A program can inform consumers of the magnitude of the MSW management problem, but it should focus on how the individual consumer can make a difference by making a simple change in his or her behavior. Consumers should feel that by participating in the program they are contributing to the solution of an important problem. They should not feel overwhelmed by the problem to the point that they think individual actions are futile. Two examples illustrate this point well. The first example, an environmental shopping program implemented by the Pennsylvania Resources Council was severely under-funded and limited in scope, but the consumers who were reached received it enthusiastically (Becker, 1987). A major reason for their enthusiasm was that the program emphasized the effectiveness of individual actions, and reminded consumers that they could help solve the MSW management crisis. The second example, a research study of ecologically concerned consumers (Kinnear et al., 1974), indicates that people who actively recycle are motivated by, among other factors, a strong sense of consumer effectiveness against generating pollution. The authors of the study suggest that public education campaigns should heavily emphasize consumer effectiveness in mitigating environmental impacts. In general, individuals should not be made to feel that they are losing control of their environment or standard of living by recycling or other resource conservation activities (Conn, 1988b; Ferrand, 1988a, b; De Young and Kaplan, 1985-86; and Stern, 1984). It is important for education programs to counteract assumptions of losing control or a lowered standard of living by stressing the relationship between source reduction/recyclability and environmental effects and associated societal benefits.

Timing of Program - Because consumer education programs seek to influence household purchasing habits, they are, by their very nature, in competition with the myriad of other advertisements and inducements vying for shoppers' attention. This applies to everything from informational pamphlets put in shopping bags, to posters hung in store windows, to product and shelf labels. For instance, a shopper awareness program conducted in San Diego, California Safeway grocery stores was judged to be ineffective due to competing promotional campaigns (Gallager, 1984; SDEC, 1982). The program was designed to increase shoppers' awareness of the "recycle symbol" and products packaged in recycled material, and to inform shoppers of the contribution that recycled packaging makes to solid waste reduction. Markers and signs identifying products with packaging made from recycled materials were placed in the stores, workers wore badges explaining the recycle symbol, shopping bags were imprinted with an environmental shopping message, and media promotions were used.

During the time the program was operating, however, the Safeway stores were also running an advertising campaign promoting their produce and were only able to emphasize one poster in their window display. The competing produce campaign appears to have taken a great deal of attention away from their environmental shopping program. In fact, only seven percent of the shoppers surveyed after the environmental shopping program was completed recalled seeing anything about environmental shopping in their supermarkets. Despite the program's lack of effectiveness in changing attitudes, 90 percent of shoppers interviewed, regardless of whether they noticed the in-store promotion or not, felt that using recycled packaging would help to reduce solid waste disposal. The same percentage claimed that all other things being equal, they would prefer to buy products in recycled packaging (SDEC, 1982). This case study highlights the fact that consumers are faced with an overwhelming amount of information each day. If a consumer education program is to succeed, its message must be well delivered and stand out.

C. Involvement of Different Interest Groups

A household consumer education program seeks to change the behavior of people from many different sectors of society. To affect behavior, a consumer education program must establish credibility with, and build a consensus among, the different interest groups in the town, city, state, or nation in which it operates. If it fails to establish credibility, the program will be rejected by many of the people it is attempting to influence, who may perceive it as ineffective or not serving that group's goals. If it fails to build a consensus, the program is likely to be compromised by lack of coordination or disagreement. An effective way for a consumer awareness program to establish its credibility and engender consensus is to involve as many different interest groups as possible from an early stage of the project.

Interest group inclusion - Interest group inclusion is an integral part of Canada's "Environmentally-Friendly Goods Campaign" (McMillan, 1988). The program will label products that are determined to be environmentally safe, such as those made from recycled materials. Representatives from key interest groups, e.g., consumers, government, trade unions, business, environmental groups, and academia will serve as advisors. These advisors will review products and services in the marketplace to determine which ones merit the "environmentally friendly" label. Interest group inclusion appears to have paid off well for the Canadian program. Although still in its preliminary stages, the program is already enjoying vigorous support from many interest groups, including business.

Another example of interest group inclusion is Michigan's "Buy Recycled" program, which focuses primarily on purchases of recycled paper, plastics, retreaded tires, and re-refined automotive oil (MDNR, 1988). The program's first step is the compilation of a catalog of selected products and their recycled materials content. The compilation will be done by environmental, civic, and recycling activists (along with anyone else who wants to be involved), who will meet with interested businesses and trade organizations to discuss the materials most relevant to particular consumer groups (Michigan Recycling Coalition, 1986). As in the Canadian program, the emphasis is on involving many different interests as early as possible. When people play active and essential roles in the development and implementation of a consumer education program, they are likely to give the program longer-lasting support.

Cooperation of retailers - Retailer cooperation is essential to the success of consumer education programs such as "Environmental Shopping Campaigns." These programs typically have taken place within limited areas and in grocery stores of the same chain. Past "campaigns" have consisted of explanatory posters, media announcements, checkout bag stuffers, and product labeling for recycled content or recyclability (SDEC, 1982; PRA, 1981; and PAMRRP, 1970s). To publicize their shelf-labeling program, the Palo Alto Material Resource Recovery Program attracted customers' attention with large in-store posters resembling traffic lights. This design grabbed shoppers' attention, and thus the same three colors were used on shelf labels to identify packaging characteristics: refillable (green), recyclable (yellow), and costly to recycle (red) (PAMRRP, 1970s).

According to the conclusions from the Red Owl Stores' "Bring 'Em Back, Repack and Save" program (Conservation News, 1976; EAF, 1976; Red Owl Stores, 1973; and USEPA, 1970s), stores that are enthusiastic about their programs will fare better with all types of consumers than stores that have little enthusiasm will fare even with environmentally aware consumers. It was also felt that store employees were not knowledgeable enough about their program to be able to answer all questions from customers.

The San Diego Environmental Shopping/Solid Waste Awareness Project (ES/SWAP) demonstrated the importance of retailer cooperation to the success of a community-wide consumer education project (Gallager, 1984; and SDEC, 1982). This project worked through the Safeway grocery store chain in San Diego for approximately eighteen months during 1981 and 1982. Apparently, the inflexibility of store policies diminished the project's effectiveness; that is, the store had a policy that only one theme at a time could be advertised in store windows. At the time of the consumer education project, the store's own "Produce" theme was already active, so the ES/SWAP received no window space. Store managers also asked that the number of in-store posters and product markers on the shelves be reduced dramatically from what the program organizers had originally intended. In addition, the posters were located in obscure areas and not easily noticed by shoppers.

Safeway store employees were to wear "recycle symbol" badges as another aspect of the promotional campaign. However, use of these badges was inconsistent. In addition, the imprints and logos for packaging materials arrived late, after the kick-off date. This lack of coordination compromised the program's promotional campaign. Furthermore, the wording "contains recycled material" on egg cartons was not graphically outstanding and might have been misinterpreted to mean that the eggs, not the packaging, contained recycled material. As mentioned previously, a survey completed after the promotional campaign indicated that a very low percentage (seven percent) of the shoppers in stores with active programs were even aware of the program. Still, 80 percent of all those interviewed felt that the recycle symbol should appear on all containers made from recycled material and 90 percent felt that using recycled packaging would help reduce the amount of solid waste disposal (SDEC, 1982). The failure of this program to inform its target audience can be attributed, at least in part, to the problems associated with the less-than-full cooperation for in-store promotion.

D. Development of Consumer Education Programs Designed for the Long Term

Consumer education programs must last long enough for consumers to take notice, to be educated, and to modify their attitudes and behaviors (Geller, 1986; and Geller and Lehman, 1986) and should be an integral part of recycling programs. Geller (1986) concludes that intervention and education programs are most likely to achieve their goals if carried out on a community-wide basis (including national and international scale efforts) and over a long period of time. Geller and Lehman (1986) note that in order to change underlying attitudes effectively, reward strategies must remain in place long enough for the more immediate behavioral changes to become second nature. In most cases, this means that the programs must be long-term endeavors, lasting for more than one year. Three factors are of key importance in determining whether or not programs will endure. However, these factors should not be viewed in a vacuum but rather in the context of the education program's goals and design. These factors are:

- funding;
- feedback; and
- adaptability.

Funding - Producing a high-quality consumer education program, initiating large outreach efforts to include many interest groups, or doing any kind of planning, is unlikely without an adequate, reliable, and long-term supply of funding. Programs reviewed for this study frequently depended upon one-time federal and state grants or piggy-backing on retailers' advertising budgets which dried up within a few months. To ensure long-term support, consumer education and "buy recycled" programs should seek funding from a variety of sources and minimize dependence on one-time contributions and government grants for program start-up. Ideally, those responsible for MSW disposal (usually the municipality or state) have the most to gain from a successful local or state campaign, and they often see the need for funding a project over the long term. Without question, the extent to which outside funding is possible varies with the type of program, but one common ingredient for success appears to be acquiring at least partial funding from a variety of sponsors including industry. Industry is acutely aware of both the growing consumer support for source reduction and recycling and the increasing demand for products and packaging which help to mitigate the MSW management crisis. In addition, industry knows that the costs of traditional waste disposal (landfilling and incineration), which are paid for by their customers, are rising rapidly, and that characteristics such as lower toxicity, recycled content, and recyclability are attractive to greater segments of their household consumer market (Dolmark, 1988; and API, undated).

Certain firms can use consumer awareness programs to capitalize on the growing consumer demand for products and packaging that promote source reduction and recyclability in various ways. To reinforce continual sponsorship, industry sponsors of consumer awareness programs receive goodwill advertisements. The Canadian "Environmentally-Friendly Goods Campaign" program is tapping the desire of industries to use consumers' environmental concerns as a marketing tool by charging industries both to evaluate their products and to license the use of the "environmentally friendly" logo (McMillan, 1988).

Consumer education programs can also enlist the funding support of companies that already produce recycled products and packaging, as well as those that want to begin producing them (for marketing or other reasons) but are not certain that demand for recycled products and packaging is sufficient to support a change in production. In the case of the latter group of companies, a relatively small investment (and involvement) in consumer awareness programs might allow them to maintain or expand their market share or move into new areas of sales. Any given company's strategy will depend upon their competitors' and their customers' responses.

One example of a company actively engaged in consumer education programs and recycling programs is FSC Paper, a producer of 100 percent recycled newsprint. FSC has implemented its Total Recycling program in several Midwestern cities. Under the program, FSC works with a community to develop a comprehensive newspaper recycling program, and agrees to buy all the waste newspaper the community collects in exchange for purchase of the recycled newspaper by the local newspaper publisher. In any community in which FSC operates a program, the company staff spends a large amount of time working with newspaper publishers, community groups and environmentalists to design education programs and newsprint collection programs. The company's education program focuses on the benefits of using recycled newsprint and encourages citizens to petition their local newspaper publisher to use recycled newsprint. The Total Recycling program operates effectively on the local level, which suggests that some future recycling initiatives may not necessarily need government funding (FSC, 1988; and Watson, 1988a).

Another example of corporate involvement in consumer awareness programs is the Brown Paper Company's promotion of the American Paper Institute's "Gray is Beautiful" campaign on the local level. The company supported a contest run by the local Woman's Club to promote awareness and selective purchase of recycled paperboard packaging (Hoosier Purchasor, 1970s).

Feedback - Programs should be designed with mechanisms to frequently monitor their success or failure in changing consumer behavior. Equally important, programs should monitor public behavior and attitudes toward the program itself (Rickmers-Skislak, 1988; Geller, 1986; and Geller and Lehman, 1986). Surveys conducted before and after several educational campaigns took place provided program organizers with a clear indication of whether consumer attitudes and behaviors changed (SDEC, 1982; and PAMRRP, 1970s). Program directors will want to know, for example, if consumers respond favorably to informational pamphlets put in their grocery bags, or feel that the large posters hanging in the store aisles are excessive or heavy-handed. This feedback will enable organizations to modify the program as appropriate to fit their audience. In addition, feedback should be provided to the consumer to indicate the effectiveness and progress of the education program. This transfer of information helps to make the consumer's efforts personal, tangible, and "visible," and enhances the credibility and effectiveness of the program, as well as the value of individual actions (Geller, 1986; Stern, 1984; and Conn, 1980).

Adaptability - Education programs should have a unified theme and should not be designed along rigid, preconceived lines, but should be flexible enough to respond to feedback and open to modifying their techniques (Rickmers-Skislak, 1988). For example, program designers who decide ahead of time to spend 80 percent of their promotional-materials budget on large, in-store posters will regret that decision later on if they discover that consumers resent the posters' presence or otherwise do not respond to that medium.

V. Understanding the Marketplace

Attempts to stimulate demand for products and packaging that promote source reduction and recyclability do not take place in a vacuum; there is dynamic interplay between the marketplace variables (which for the most part industry decision-makers determine), consumer concerns (which may be reflected in their purchase decisions and through other channels), and government policies. This section presents a short overview of market forces, looking at industry, consumer, and government roles in the marketplace. Each of the key players, i.e., industry, consumers, and government, can take advantage of changes in the marketplace. It is important that program organizers understand and work within the established structure of the marketplace. For companies to maintain or gain market shares in the future, they may have to respond to consumer and social concerns about the MSW management crisis. All levels of government must coordinate their own actions to guide the relationship between consumers and industry towards increasing the availability and purchase of products and packaging that promote source reduction and recyclability.

A. Industry Roles

Company product and packaging marketing strategies are traditionally described by the four P's: product, place, promotion, and price. Geller (1988) adds two more market influences to this list that are not under marketers' control: politics and public opinion. The four P's represent marketing areas in which the management of a company has control (Becker, 1981).

> **Product:** The characteristics of the product which is being marketed (e.g., design, quality, safety, aesthetics, convenience and the environmental consequences of production, use, and disposal).
>
> **Place:** The distribution of a product, including where and how much of a product will be made available.
>
> **Promotion:** The advertising campaign or campaigns which the management chooses to use for selling a product.
>
> **Price:** The cost of a product to consumers.

Industry decision-makers continually adjust these market variables in order to create a product which they feel will be competitive in the marketplace. A product need not necessarily be competitive across all variables. For example, a higher-priced product can compete successfully with lower-priced products if the quality of the product is superior to the competition and/or the promotional campaign convinces consumers that the quality of the higher-priced product is superior. Over the same time period, more durable products need fewer repairs and less frequent replacement than do less durable products. These products' increased utility can often result in long-term cost savings to consumers. Indeed, car manufacturers such as Volvo and household appliance manufacturers such as Maytag have based promotional campaigns on the quality and durability of their products.

Generally speaking, the quality of products containing recycled materials has been vastly improved in the last twenty years. However, there has been relatively little effort aimed at changing consumer misconceptions. The quality of recycled products needs to be demonstrated, advertised, and used as a selling point rather than hidden and considered detrimental (VandenBerg, 1988, 1987). For example, in the 1960's, the re-refined oil industry was forced to label its products as containing recycled content. This connoted a lower quality to many consumers and led, along with other factors, to a decline in this industry (Elliot, 1987; and Brinkman, 1986).

As awareness of the MSW management crisis and other environmental consequences of purchase decisions continues to grow, it will be increasingly important for industry decision-makers who are concerned with maintaining their companies' market position to develop products, packaging, and promotional campaigns which address these issues (e.g., using cost-consumer materials, helping to develop standards for recycled content, and marketing these features to consumers). There are already several publications, or shopping guides, which rate individual products' environmental consequences and companies' environmental records (CEP, 1988; and Dadd, 1988). This suggests that in the future, in order to remain competitive, product marketers may have to address consumer concerns over the MSW management crisis.

Societal concerns determine how consumers will react to a product or package which industry makes available. Consumers can affect the types of products and packages that are available and can determine the success or failure of a product if manufacturers and marketers believe that consumer concerns are strong and widespread. Industry, in turn, uses market surveys to monitor and react to trends in consumer concerns. For example, between the 1986 and 1988 Packaging magazine surveys, the number of respondents who claimed they "often" or "sometimes" considered the recyclability of packaging rose from 36.2 percent in 1986 to 48.4 percent in 1988 (Erickson, 1988). Becker (1981) has specified eight issues that consumers take into account when making purchase decisions: information, health and safety, repair and servicing, pricing, pollution, market concentration, product quality, and consumer representation before government. Becker suggests that there is an opportunity matrix for business management which relates consumer issues to marketing decision variables. In order to take advantage of this opportunity matrix, a company needs to identify potential conflicts between consumer concerns and their products and packaging in order to tailor their marketing strategy (product, price, promotion, and place) to reflect consumer concerns. In support of the importance of these issues to consumers, Kinnear and Taylor (1973) found that decisions concerning the purchase of laundry detergents were related to the ecological concern of consumers. This suggests that consumers who are concerned with the environment are willing to re-evaluate their purchase decisions in order to account for a product's or package's environmental consequences if their awareness is raised. A product or package that is known to have comparatively fewer environmental impacts than its competitors may have an advantage among consumers who are environmentally concerned.

B. Consumer Roles

Consumer groups may attempt to influence industry decision-makers to take notice of consumer issues in several ways. Letter writing campaigns, such as those encouraging Coca-Cola to discontinue using a combination plastic and metal can, or encouraging Recycled Paper Products, Inc. to use recycled feedstock for all of their greeting cards (or else not market virgin paper cards under their company name), not only demonstrate how many consumers are concerned, but also generate good or bad publicity for the targeted companies (Ferrand, 1988c). Preferential consumer purchasing on a large scale can impart economic gains to a selected company or product line. Alternatively, consumer boycotts, which can be combined with letter writing campaigns, can inflict economic losses on corporations that do not heed consumer concerns. Recycled packaging awareness campaigns, such as the Palo Alto and San Diego programs, generate awareness of the MSW management crisis and encourage the purchase of products that have fewer environmental impacts (Gallager, 1984; SDEC, 1981; and PAMRRP, 1970s). Such promotions can provide a competitive advantage to companies that sell products with fewer environmental consequences.

C. Government Roles

Governmental regulations, taxation, funding, and education/oversight policies can affect the types, prices, and the promotion of products which industry makes available to consumers. Government-imposed bans on packaging, such as a ban on the use of styrofoam containers in Portland, Oregon restaurants can directly affect an industry's product marketing strategies, albeit attacking a very small percentage of the MSW stream. Differentiated sales taxes/credits based on container recyclability have been proposed in Maine, New Jersey, New York and other states. These taxes/credits may affect prices and may create a competitive advantage for products and packaging with recycled content or those that are recyclable (Environmental Action Foundation, 1988). However, there has been little experience with these types of taxes, and even less consideration of the size of an effective tax and their placement. Regardless of how credits or taxes are imposed (at the industry or consumer level), an extrinsic incentive or disincentive should be combined with an awareness program in order to inform consumers about which, how much, and why products are being credited or taxed. For example, Geller et al. (1983) found that both tangible extrinsic rewards, such as monetary savings, and informational feedback, were needed to motivate residential conservation of water.

Government activities that may improve the quality (actual and perceived) of recycled products include the preferred purchasing of products which meet minimum standards for recycled content and establishment of standards for, and definitions of, recycled content. Because government purchases represent a large market (approximately 20 percent of the gross national product -- Case, 1989), it is believed that they can strengthen the industry and lead to greater availability of recycled products (Keller, 1988). Under the Resource Conservation and Recovery Act, the EPA has established guidelines for purchase of five categories of products: paper, lubricating oils, tires, concrete and cement, and thermal insulation. Government purchases also represent a quality endorsement of a product (Brinkman, 1986). Household consumer concerns about the quality of recycled materials might fade if such materials met government requisition quality specifications.

While some products and packages are marketed as high-quality durables, and reusables, others are promoted for their disposability. Many consumers have been convinced that disposable products, as well as certain types of packaging, are more convenient (Erickson, 1988). To allow consumers to make informed tradeoffs between convenience and other implications of product and package usage, awareness programs -- by government, industry, retailers and other groups -- could identify the environmental costs of disposable products and promote the high-quality attributes (e.g., containing less materials, longer lasting) of source-reduced products and packages and encourage their use. In addition, these programs could highlight the quality of life improvements that can be expected with lessened environmental impacts. That is, a counteracting marketing campaign could identify and creatively illustrate the social costs associated with environmental cleanup and pollution control due to disposable products for society as a whole. For example, governments, retailers, or others could educate consumers of the cost savings and environmental benefits of using durable eating utensils or buying certain goods with source reduction (e.g., purchased in bulk or minimum packaging) or recyclability (e.g., made with recycled or recyclable materials) attributes in order to minimize materials or packaging used and disposed, though convenience would be lessened.

One major problem faced by consumers is the lack of standardized definitions and labeling for recycled content or recyclability. Exhibit 6 presents a few of the variety of symbols in use today connoting recycled, recyclable, and "environmentally friendly" products and packaging. Many products and packaging that promote source reduction and recyclability, such as products which use recycled paperboard in their packaging, are not labeled as such (API, 1988). Other products and packaging that do not promote source reduction and recyclability use company names or have worded labels that imply that they do. For example, a greeting card company called Recycled Paper Products markets under its company name some of its greeting cards that do not contain recycled paper (ANJR, 1988).

Government, industry, consumers, academia, and other interested groups can adopt and promote a simple standardized system of definitions and labels for products and packaging with information about their environmental consequences. Standardization of labeling can allow consumers to identify quickly and easily products which have a minimum recycled content or are recyclable (VandenBerg, 1988). Widespread use and publicity of a consistent definition is also important to the integrity of a product label or endorsement. In order to further facilitate consumers' search for products and packaging that promote source reduction and recyclability, state and local governments have already developed shopping guides listing supply houses or the manufacturers of these products and packaging (MDNR, 1988; PRC, 1988; CFE, 1987; City of Berkeley, 1980s; and SED, 1980s).

VI. Influencing the Relationship Between Consumers and Marketers

This section briefly reviews the problem of promoting recycled content in the marketplace. This is followed by an examination of several new developments in the marketplace that appear to be improving the climate for the advertising of products and packaging promoting source reduction and those that have recycled content or are recyclable. The "marketplace" refers both to individual consumers and to companies that design, manufacture, package, distribute and advertise products. The discussion that follows is intended especially for consideration by marketers, to evaluate how the context for revealing recycled content is changing.

Recent marketplace developments that encourage the purchase of products and packaging made from recycled materials or that are recyclable can be summarized by four general trends. First, recent public opinion polls reveal a heightened public awareness of, and desire to be involved in solving, environmental problems, particularly as related to recycling and solid waste management (e.g., Erickson, 1988; Modern Brewery Age, 1988; NSWMA, 1988a; and Robert Marston and Associates, 1988). Second, "cause related marketing" is being used by product marketers to capitalize on consumers' interest in supporting various socially and environmentally beneficial causes by linking financial support of these causes to product purchases. Third, consumer activism is being used by non-profit groups to promote environmental shopping and letter writing campaigns. Fourth, selective use of labels can be used to designate products as having fewer environmental impacts (i.e., less toxic, made from recycled material, recyclable, etc.).

When evaluated together, these developments are cause for optimism. Each lends strong encouragement to manufacturers and marketers to not only use recycled materials, but also to integrate recycling-related concepts into their publicity and advertising strategies. One leading package designer already has declared "recyclable" a new market "hot button." Despite a history of somewhat negative connotations, use of the term "recycled" might become increasingly attractive.

An important component of a comprehensive solid waste management strategy is to enhance the image of recycled content to attract new consumers of, and increase demand for, material being reclaimed through collection programs. There are, however, several major barriers to manufacturers' voluntary use of recycled content. First is the belief that recycled materials are inferior in performance and appearance to their virgin material counterparts. Second, many manufacturers who do use recycled content generally have been reluctant to publicize this to their customers, for fear that their products may be perceived as inferior by consumers. From the point of view of the solid waste planner, a most unfortunate consequence of the "hidden use of recycled content" is the missed opportunity to enhance the reputation of recycled content.

In some cases, goods made with recycled materials may be more expensive than goods made with virgin materials until large markets are developed. State and Federal agencies are entertaining a wide range of innovative proposals, and, in some cases, legislation to provide financial incentives and disincentives for the use of recycled material and recyclable packaging. For recycled content, mandatory government procurement quotas, modification of restrictive procurement specifications, and preferential pricing are among the most widely adopted policies thus far. Financial disincentives, such as packaging material surcharges and taxes, also are being considered to offset the effect of some of the subsidies available to virgin materials industries, to discourage use of nonrecyclable or excess packaging, and to reward purchase of products and packaging that promote source reduction and recyclability. These actions will be more effective if there is more voluntary marketplace acceptance of recycled content. Instilling consumers with pride, similar to the intent of the "Buy American" campaign, could be the most cost-effective way to assist the growth of markets for recycled materials.

To overcome negative associations with the concept of recycled content, industries need compelling evidence that items with recycled content can perform equivalently to items without recycled content, and that consumers will respond favorably to the designation "contains recycled material." Establishing the case that consumers might prefer recycled content, or at the least not be prejudiced against it, is difficult, both for lack of good research data on the subject, and because negative attitudes are so strongly held on the part of manufacturers and packagers. With few exceptions, American manufacturers and marketers that use recycled content are not yet convinced that it has become "safe" to promote the label "recycled" in association with their products, or that the word "recyclable" offers a strong competitive advantage. However, network television advertisements were shown nationally May/June 1989 by Alcoa (1989) and the Glass Packaging Institute (1989) promoting the benefits from recycling aluminum and glass containers, respectively.

Despite the success of its "Gray is Beautiful" campaign promoting recycled paperboard packaging, Rodney Edwards (1987), President of the American Paper Institute, believes that the packaging industry is well justified in its aversion to the use of a label to identify "recycled" content. He reported that the market for items made with reprocessed wool went "rapidly downhill" shortly after a 1935 law was passed requiring it to be labeled as such. This not only gave virgin wool a market advantage, it also established a stigma for the word recycled that endures and acts as a barrier to the promotion of other recycled materials in today's marketplace.

Edwards (1987) also cited an instance where a company discontinued use of the recycled symbol because letters from consumers praised their product, but never mentioned the recycled symbol. This firm discontinued using the recycled symbol rather than take the risk that if it were not considered a positive attribute, there might be a negative association.

Another industry representative confided that his company routinely tests the recycled paper packaging it uses, as a precaution against the occurrence of PCBs (banned in the 1970s from multi-copy paper) in the material. This is in reaction to the finding a few years ago that a load of recycled paper had been contaminated at a mill by carbon papers that were mixed into the recycled feedstocks. This company does not now advertise its recycled content but is organizing an internal committee to re-evaluate the company's stance on this.

Albin Voegele, President of Vermont Republic Industries, which manufactures products from recycled plastic, has a pessimistic view of the feasibility of promoting recycled content:

> . . . given the symbolism inherent in language, the use of the word "virgin" should not be used in association with the concept of recycling. The word "recycled", indicating the reuseableness of a material in contradistinction to "virgin" indicating that the material is being used for the first time, puts the concept of "recycling" in an uphill, and potentially losing, battle to (re)gain a connotative and "affective" response of positiveness. We have to move from the connotation of using soiled and stained materials towards a reincarnate (i.e., designed) use of materials for a series of sequential products." (Voegele, 1989)

Whatever drawbacks are associated with using products and packaging that promote source reduction and recyclability, there are several ways to offset the negative associations consumers may have with non-virgin materials. Furthermore, marketing experts are now touting environmentally conscientious marketing as a way to profit from growing consumer concerns about environmental degradation. The remaining subsections deal with four aspects of the marketplace (i.e., public sensitivity to environmental issues, cause-related marketing, environmental shopping and letter-writing campaigns, and labeling issues) that influence the success of programs designed to increase consumer demand for products and packaging that result in reduced environmental impacts.

A. Public Sensitivity to Environmental Issues

The problems encountered with promotion of recycled content in the past, should be viewed in their historical context, juxtaposed against social values about consumption. When disposable containers were first introduced, one advertisement portrayed the tossing of a convenient, throw-away bottle, out of a car window, and into a lake, as a desirable action. This advertisement would not be looked upon favorably in today's pollution conscious society.

Because social attitudes and values related to consumption and environmental degradation have changed, marketplace conditions are now more favorable for promoting recycled content. Several recent public opinion polls have established that the public is aware of, and greatly concerned about, solid waste management and threats to the environment from improper management (e.g., National Solid Wastes Management Association, 1988a; and Robert Marston Associates, 1988). For example, a 1988 survey found that while only 20 percent of Americans identify themselves as Republicans, and only 31 percent say they are Democrats, 39 percent describe themselves as environmentalists (Research Alert, 1988).

One example of increasing social concern about the environment is the January 1989 issue of Time magazine which named the Earth as Planet of the Year in lieu of the usual Man or Woman of the Year. The cover photo depicted an earth globe wrapped in plastic and bound in knotted rope, as the editorial said, to emphasize "earth's vulnerability to man's reckless ways." Solid waste was described as one of the four top threats to the environment. In terms of per capita waste generation rates for cities around the world, New York City topped the ranking at 4 pounds per capita per day, the next highest being 3 pounds per capita in Tokyo, with many other cities elsewhere in the world showing as little as 1 to 2 pounds per capita (Miller, 1989).

In a similar vein, the December 1988 National Geographic also featured articles on world environmental crises. Its cover photo was a holographic image of an exploding planet with the caption: "Can man save this fragile earth?" One article then presented portraits of the daily lives of five families to illustrate differences in the average standard of living in each of their respective countries. The effect was to convey the magnitude of difference that exists between the standard of living for Americans and the rest of the world:

> The birth of a baby in the United States imposes more than a hundred times the stress on the world's resources and environment as a birth in, say, Bangladesh. Babies from Bangladesh do not grow up to own automobiles and air conditioners or to eat grain fed beef . . . Central American forests are destroyed in part for pastureland to make pet food and convenience food in the United States slightly cheaper; in Papua New Guinea, forests are destroyed to supply cardboard packaging for Japanese electronic parts (Ehrlich and Ehrlich, 1988).

Certain industry leaders have recognized this social trend and have declared that environmental and solid waste management concerns hold promising opportunities for marketers. The journal, American Demographics, routinely tracks all kinds of polls and surveys for its readers, and offers advice on new market trends. In its February 1989 issue, editor Cheryl Russel exhorted marketers to take advantage of consumer interest in the environment:

> . . . nearly half of Americans believe the environment around them is getting worse -- a proportion that is up 14 percentage points in just one year, according to a survey by Cambridge Reports Trends & Forecasts of Cambridge, Massachusetts.
>
> Americans are in a fix. Every day they eat 14 million hamburgers (rain forests are being cleared to make way for grazing beef cattle), throw away half a million razors (not to mention 5 million diapers), and buy 25,000 air conditioned cars (each of which dumps five tons of carbon dioxide a year into the atmosphere). Americans want to do right by the environment, but almost everyone does it wrong. This fix is a hot button for marketers.
>
> Thirty-nine percent of Americans strongly identify themselves as environmentalists, according to a Gallup survey for the Times Mirror. Environmentalists are themselves a bigger market than some of the hottest markets of the 1980s -- such as Hispanics (8 percent of the population), married couples with children (20 percent), or even the baby boom (31 percent).
>
> Forty-seven percent of all consumers . . . are "much" or "somewhat" more inclined to go to a store or restaurant that is committed to reducing its use of plastic containers and utensils (Russel, 1989).

Ahern & Heussner Advertising in New York City (which names Conde Nast [publisher of Glamour, GQ, and other magazines], British Airways, and Chemical Bank among its clients) recently conducted a research project that involved interviewing experts about solid waste and recycling issues. Ahern & Heussner explain that their focus on environmental issues stems from a "personal and intuitive belief in the importance of these issues to the average consumer." They used results of these interviews and information from published literature, to create a brief primer and proposal for prospective clients. As a promotional device for their firm, they also are developing a brochure which features their top ten predictions about consumer preferences. Draft copy of these predictions reads as follows:

- Garbage will become big business. Packaging will become a dirty word.
- With most landfills expected to be filled by 1995, recycling will likely be mandatory in most municipalities.
- Consumers will make the nasty chore of sorting trash more manageable with a host of new home appliances and recycling containers like partitioned trash cans. Procter and Gamble and other consumer goods marketers will have to figure out ways to "unpackage" their goods as trash weary consumers lean toward products that avoid unnecessary overwrap (Ottman, 1989).

Although the pricing of trash disposal on a user fee basis is relatively new, it is expected to become widespread, and will create disincentives to generating wastes, resulting in more households paying even closer attention to how they manage their wastes. John Naisbitt, author of the best selling book, Megatrends, offers marketers this advice in his February 16, 1989 "Trend Letter":

> In an age of spiraling municipal costs for trash disposal and increasingly scarce landfill sites, a pay-by-the-bag garbage system could spread across the U.S. and in cities abroad. . . . By making households individually accountable for the cost of disposing of their trash, communities would give a significant boost to recycling programs. Sales of kitchen disposal units and compactors would escalate (Naisbitt, 1989).

The December 1988 issue of Metropolis, the Architecture and Design Magazine of New York, featured a cover story titled: "Garbage of the Future." The major point of the story was to explain that package designers must begin to consider the solid waste impacts of their designs, not only because of negative consumer perceptions about the wastefulness of packaging, but also because leading experts in the field of marketing have declared it a profitable way to attract consumer interest.

Stewart Mosberg, President of the Package Design Council, has recently founded the Packaging Coalition for Solid Waste Management. The Coalition is intended to persuade packaging designers that they have a problem that can be turned to their advantage. In regard to looking at recyclability, Metropolis quotes Mosberg:

> We've worked hard to establish credibility in the marketing mix. Now we're getting a bum rap: "You designed it, you get rid of it. You guys design this stuff. Design something easy to get rid of."

About the words "New! Recyclable!", Mosberg says: "I believe it is going to be a market position in the 1990s." Richard Gerstman, a leading packaging design consultant is quoted as saying:

> In general, those of us involved in packaging have a tremendous opportunity, now at the threshold of the nineties, to be the good guys in the tumultuous decade to come (Jacobs, 1988).

As consumers become educated about the environmental consequences of waste disposal, they will look for ways to mitigate these impacts. The greatest contribution individual consumers can make is to purchase products and packaging that minimize adverse environmental consequences and promote source reduction and recyclability. Furthermore, corporate America is also becoming more sensitive to environmental issues. This growing public and corporate awareness is evident from a 1988 survey of sixty-seven Fortune 500 companies and is expected to continue over the next few years (Meeker & Associates, 1988).

B. Cause Related Marketing

Cause related marketing promotes social or environmental benefits of a product's purchase along with traditional product characteristics such as price, quality, and personal satisfaction. These are not products that have been manufactured expressly as fund-raising mechanisms for the causes promoted; rather, they are mainstream consumer products with social or environmental benefits which may have only recently been promoted. The priority concern is that of seeking new customers, while the social or environmental benefits generally are a secondary concern to the marketers (Becker, 1981).

Although the product or service is enhanced by association with a moral cause, and is intended to present a strong inducement for the consumer to buy, the product or service may also be bought by consumers who have no concern for the cause. Nonetheless, product manufacturers may view these appeals as an additional means by which they can favorably differentiate their products or services from the competition. Marketers usually consider differentiation in itself to be a desirable attribute. It is likely that as a few leading companies prove successful with this approach, more companies will follow suit. A few examples illustrate the variety of products and services that have successfully applied cause related marketing techniques.

- During May/June 1989, Alcoa (1989) and the Glass Packaging Institute (1989) sponsored national television advertisements promoting the recyclability of aluminum and glass containers, respectively, and the benefits of reducing the MSW management crisis through their recycling.

- Working Assets VISA is a credit card service that donates 5 cents to groups that work for peace, human rights and the environment, each time the credit card is used (Working Assets).

- Polaroid will donate $5 to one of four causes as a reward for responding to a brief marketing questionnaire that accompanies the purchase of a camera. These causes are: Ronald McDonald House, American Heart Association, United Negro College Fund, and Yosemite Association (Polaroid Consumer Center).

- The Social Investment Forum is a clearinghouse of information on special investment funds that uses various social criteria as "screens" in qualifying corporations for their stock portfolios. The Forum reports that in 1984, $40 billion was invested with reference to these screens. By 1988, this rose to $450 billion. Initially, these programs were related chiefly to divestitures in South African related businesses, but they now also include environmental and other criteria (Davidson, 1989).

If the phenomenon of cause related marketing proves to increase sales measurably, consumer demand could increase to the point where private consumption routinely leverages cause related benefits. Recycling activities could be promoted as a "cause related" benefit (e.g., see above discussion of efforts by Alcoa and Glass Packaging Institute), if the financial consequences (or social costs) of such behavior could be convincingly presented to consumers. In research by De Young (1985) and De Young and Kaplan (1985-86), it was determined that a broad cross-section of Americans derive satisfaction from conservation behavior.

C. Environmental Shopping Campaigns

Mark Silbergeld, an attorney for Consumers Union (which publishes Consumer Reports, a periodical devoted to product comparisons), has pointed out that it is not necessary for all of the buying public to shift its purchase habits at once. A substantial segment of the buying public could have a significantly favorable impact on the situation. Therefore, the task is to identify a segment of the market that can be persuaded to support recycled content. He also remarked that it probably is not possible, nor desirable, to provide recycled content alternatives for all the virgin materials used in products and packaging now available, even if a segment of the consumer market could absorb all supply.

In an interview conducted for this report, Mark Silbergeld was asked whether Consumers Union might not incorporate environmental and solid waste impacts analysis into some of its product testing and evaluation reports. He responded that a new product or product characteristic must first become widely available "on the shelf" and offered by a number of different companies, so that meaningful comparisons can be made among brands. Comparisons of general types of packaging would not fall within their normal evaluation procedures unless there were environmentally preferable alternatives among the competing brands. In the context of product comparison reporting, Consumer Reports would not usually comment on desirable innovations that have not reached the market (Silbergeld, 1989).

As is the case with cause related marketing, environmental shopping campaigns are not likely to attract 100 percent participation, yet they can have a positive effect on a significantly influential segment of the consumer market. The Council on Economic Priorities (CEP), is a non-profit public interest research organization that recently published Rating America's Corporate Conscience. The book's subtitle describes its purpose: "A Provocative Guide to the Companies Behind the Products You Buy Every Day" (Lydenberg, Marlin, Strub, and CEP, 1986). CEP rates 130 companies on their performance in seven issue areas. In response to the success of the book, CEP next published "Shopping For A Better World," a 3½" by 5½" booklet, intended to be used as a reference guide when shopping. It summarizes, in chart form, information on 1,300 products and 138 companies, including environmental concerns. Leslie Gottlieb (1989), a staff member of CEP, explained the purpose of the guide: "[t]he Guide is in response to consumer demand. We know we are on to something. People want to know the policies behind the companies they buy from, beyond the advertising." As a measure of their popularity, the first three printings (of 300,000 copies in bulk and individual sales) sold out in just six months. Additional shopping guides, such as "The Official Recycled Products Guide" (Boulanger, undated), are available from a variety of other groups and businesses.

In 1986, the Pennsylvania Resources Council (PRC) created an Environmental Shopping program that now includes publication of a brochure and a booklet titled: "Become an Environmental Shopper: Vote for the Environment" (PRC, 1988). The booklet advises consumers to look for packaging codes, and reusable and recyclable packaging, to avoid throw-aways, and to write to manufacturers to encourage them to shift to reusable and recyclable materials. The guide also advises groups on how to organize Environmental Shopping campaigns in their communities. The Pennsylvania Food Merchants Association is cooperating with this work. PRC also intends to develop a "good environmental housekeeping seal of approval" that they would invite qualified manufacturers to display on their products. PRC also has plans to develop a video (Becker, 1988).

Many consumers have become environmental shoppers and buy products with a preference for reusable, recyclable, or compostable packages, or bulk purchases (e.g., Esco, 1988). Reusable shopping bags are also being offered as an alternative to paper and plastic bags. Various groups are currently promoting reusable shopping bags as an alternative to paper and plastic bags. For example, the Coalition for Recyclable Waste is offering a cooperative marketing program to individuals and other recycling and environmental groups who want to sell canvas shopping bags to displace paper and plastic. The PRC also has plans to market a cotton mesh shopping bag.

D. Letter-Writing Campaigns

Consumer activism in the 1960s and 1970s focused chiefly upon truth in advertising, proper product labeling, and the identification of negative effects of products on individual safety and health. This led to the passage of many laws, such as the Consumer Product Safety Act, regulating production of products and requiring testing, disclosure, and labeling of health effects. In addition to traditional consumer concerns, the consumer movement of the 1980s reflects societal concerns about the effects of products on the environment.

Although it is true that there is strength in presentations and appeals by organized groups, the potential impact of individual interactions with industry and government agencies is underestimated by the average consumer. Letter writing campaigns have proven particularly effective in influencing both government and industry consideration of the environmental impacts of solid waste by encouraging or discouraging certain policies or behaviors (Ferrand, 1988a).

John Goodman is a principal of the Technical Assistance Research Programs Institute, a consulting firm that advises major corporations on customer relations. Goodman (1989) advises that there are three major factors which, when occurring together, will virtually guarantee the personal attention of the chief executive officer of a corporation. First, environmentally-related complaints are registered not just by avid environmentalists, but by a cross-section of their customers who have purchased their products over a period of time. Second, complaints are evaluated as part of a persistent trend as opposed to a transient reaction. The third factor that affects whether a company respond to letter writing campaigns is whether the number of complaints from unaffiliated consumers reaches 100. Though there is no data to support this last point, Goodman is confident, based on his own experience, that this usually holds true whether the product is an expensive car or a bottle of shampoo. These factors indicate that an effective means of influencing the relationship between consumers and marketers is to provide good educational materials to a large audience, to encourage individuals to respond in their own words, and to sustain the program over a long period of time.

This approach has been successfully demonstrated by the Coalition for Recyclable Waste. Under the coalition's leadership, hundreds of consumers, including recyclers, environmentalists, students, state and local government officials, and recycling industry representatives contacted Coca-Cola to protest the test marketing of a can made of a polyethylene terephthalate body, polyvinyl chloride label, and aluminum top. Environmentalists, recyclers, local municipal and state, government officials, aluminum processors, and incinerator engineers protested the use of this plastic-aluminum can because it was considered a poor replacement for aluminum cans. The container was difficult to economically separate for recycling and posed contamination problems for both aluminum recycling and MSW incineration. It also bore the label, "recyclable", even though opportunities to recycle were limited to the use of a half dozen reverse vending machines. To its credit, Coca-Cola terminated its test marketing with the announcement that it would not pursue this package until the "recyclability issues can be resolved." An outgrowth of this campaign, the first for the Coalition for Recyclable Waste, is a network of hundreds of opinion and policy leaders who are interested in using letter writing campaigns again to affect a variety of other issues related to product and packaging design and recyclability (Coalition for Recyclable Waste, 1989).

As a related example, consumer interest in healthier diets has encourag4ed markets to provide and promote food products which appeal to this increasing segment of the population. Similar results can occur if consumers state and follow-through on their desire for products and packaging promoting source reduction and recyclability (Hurst and Relis, 1988).

E. Labeling

This section briefly discusses a variety of labeling schemes that could be used, or which are already in use, to support recycling and other solid waste management objectives. Standardized labels, codes, or symbols can be used to accomplish any of a variety of goals: to educate and encourage consumers to buy products and packaging that promote source reduction and recyclability; to identify recycled or recyclable materials used in products and packaging, thereby improving recovery and reuse of post-consumer materials; to create an incentive for industries to earn positive recognition for their products and packaging; and to indirectly stimulate manufacturers to change their production or packaging practices.

In conjunction with local and state environmental and waste management officials, and its own members, the National Paint and Coatings Association (NPCA) developed a disposal labeling statement for its consumer paint products. NPCA's efforts were undertaken in response to local and state waste management officials concerns and expected state labeling initiatives.

For solvent-based paint products, the label reads:

> "For disposal guidance of unused amount contact a household hazardous waste program, or your local or state government environmental control agency."

For latex and water-based paints, the label reads:

> "For disposal guidance of unused amount contact your household refuse collection service, or your local or state government environmental control agency."

Use of these labels will be phased in over time (Household Hazardous Waste Management, 1989).

Another approach that could be used to achieve these goals would be to label magazines according to the type of binding glue used and inform household recyclers about their differences in recyclability. Most magazines today use hot melt glues for bindings and mailing labels that are not typically water-soluble. It is expensive and difficult to remove this type of wastepaper in the recycling process. Water soluble alternatives do exist that would be compatible with recycling, but to date there appears to be no mechanism to persuade companies to favor its use. Yet if labeling of such products were done, it could improve the recyclability of wastepaper.

Watson (1988b) explains that there is only one newsprint de-inking mill in North America, Quebec and Ontario Paper Co. Ltd., that is using significant quantities of magazine wastepaper. Its mix is 45 percent virgin wood pulp and 55 percent recycled paper. Of the recycled portion, 65 percent is old newspaper and 35 percent is magazine wastepaper. Increased use of magazine stock could actually improve the strength and brightness of newsprint.

If publishers that do use water-soluble glues could prominently display an approved logo to that effect, then households (and wastepaper collectors and processors) could perhaps be taught that it is okay to add these magazines to their to-be-recycled paper mix. Such labeling would also be helpful in building visibility for the idea of recycle-friendly products, and could reward magazine publishers with favorable publicity.

A labeling scheme for plastic containers being developed by the Society of the Plastics Industry (SPI) appears rather straightforward, but has generated some controversy. Because a number of businesses (and states) are preparing to adopt this system, there is an urgent need to develop a broad-based national consensus on the definition of "recyclable." Exhibit 6-C shows one set of symbols proposed by the plastics industry to identify the type of resin used in products and packaging in order to enhance their recyclability. If states vary in their adoption of standards and regulations for describing products as recyclable, businesses could incur considerable additional expense to accommodate differences among states.

The basic elements of the SPI voluntary coding system have met virtually unanimous support: each of seven different plastic resin types is to be designated by a number imprinted on the bottom of the containers. The primary aim is to assist recycling processors, not consumers, to make proper separation of resin types as may be appropriate to their recycling operations. A few companies already have begun to modify their production processes to accommodate this scheme.

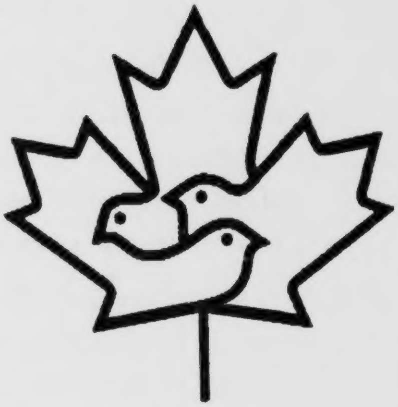
However, SPI has proposed that these numerical codes be enclosed by a three-arrow triangular symbol. This has met with opposition from ten states represented by members of the Council of State Governments' Eastern Regional Conference Northeast Recycling Council (NERC): Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. In most of these states, the average consumer does not have a means to conveniently

Exhibit 6

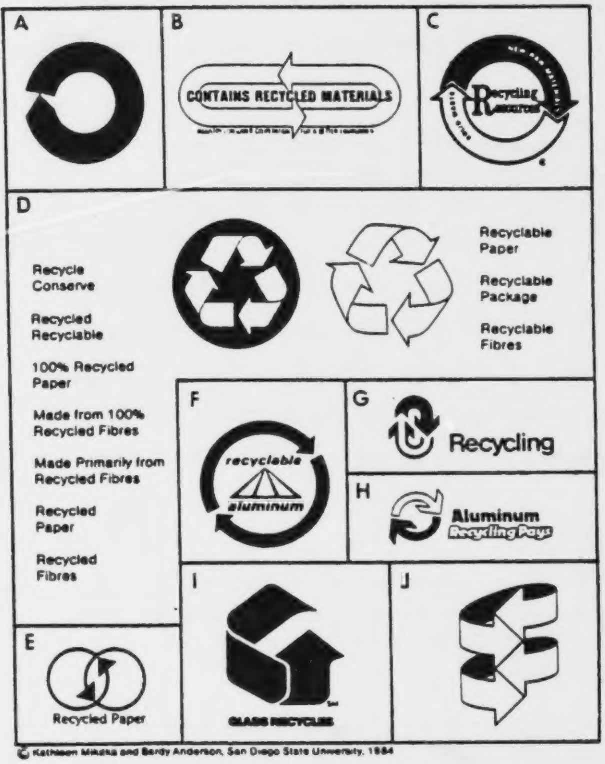
Examples of Recycling Symbols

Examples of symbols designed to facilitate "environmental shopping" and recycling. Exhibit A shows a variety of recycling symbols from different sources (Mikitka et al., 1984). Exhibit B shows Canada's "Environmentally Friendly Goods" symbol (McMillan, 1988). Exhibit C shows the Society of the Plastic Industry's container coding system.

B



A


A
B
CONTAINS RECYCLED MATERIALS
C
Recycling Resources
D
Recycle
Conserve
Recycled
Recyclable
100% Recycled
Paper
Made from 100%
Recycled Fibres
Made Primarily from
Recycled Fibres
Recycled
Paper
Recycled
Fibres
Recyclable
Paper
Recyclable
Package
Recyclable
Fibres
E
Recycled Paper
F
recyclable
aluminum
G
Recycling
H
Aluminum
Recycling Pays
I
GLASS RECYCLES
J

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Symbols reprinted by permission of McGraw-Hill (A), National Association of Recycling Industries (B and C), Container Corporation of America (D), Aluminum Association (F), Aluminum Company of America (G), Reynolds Aluminum (H), Glass Packaging Institute (I), and the advertising firm of Cunningham, Black and Farley (J). Origin of "E" is unknown.

C

CODE	MATERIAL
1 PETE	Poly-Ethylene Terephthalate (PET)
2 HDPE	High Density Polyethylene
3 V	Vinyl / Polyvinyl Chloride (PVC)
4 LDPE	Low Density Polyethylene
5 PP	Polypropylene
6 PS	Polystyrene
7 OTHER	All Other Resins and Layered Multi-Material

recycle plastic containers. NERC endorsed the adoption of the seven identification codes, but unanimously adopted a formal resolution which declares, in part:

> . . . use of a three arrow, or other similar, recycling symbol on plastics for which a viable recycling system has not been demonstrated is likely to subvert such symbols' generally understood meaning, and is likely to be detrimental to recycling programs.
>
> . . . whereas, (NERC) supports uniformity in plastic material identification codes, NERC opposes the use of a recycling symbol in conjunction with plastic material identification codes (NERC, 1989).

SPI maintains that use of the symbol is necessary to maintain visibility and avoid confusion by separating the code from other markings on the containers. SPI's members are also engaged in major research efforts to improve the recyclability of plastics. SPI members are also pursuing publicity campaigns to change the public's perception of plastics as non-recyclable (Erickson, 1988).

New Jersey's mandatory recycling act, passed in 1987, has, in effect, already imposed a performance criterion that would limit the use of words or symbols designating items as recyclable. Other states are considering the adoption of similar language. An excerpt of this statute reads:

> No plastic or bi-metal beverage container shall be identified as a recyclable container unless the department determines that a convenient and economically feasible recycling system for that specific container is available (P.L. 1987, c. 102, section 10)

NERC's resolution against the SPI's proposed symbol is not the first time that it has taken action on a problem of definitions. In June 1988, the same ten states and the City of Philadelphia voted unanimously to adopt standard definitions for describing "post-consumer material," "recovered material," and "recovered paper material" (NERC, 1989). In addition, NERC has also recommended definitions for recycled content for each major type of recycled paper product.

> postconsumer material means only those products generated by a business or consumer which have served their intended end uses, and which have been separated or diverted from solid waste for the purposes of collection, recycling disposition.
>
> recovered material means material and byproducts which have been recovered or diverted from solid waste, but such term does not include those materials and byproducts generated from, and commonly reused within, an original manufacturing process (such as mill broke or home scrap).

> recovered paper material means paper waste generated after the completion of a papermaking process, such as postconsumer material, envelope cuttings, bindery trimmings, printing waste, cutting and other converting waste, butt rolls and mill wrappers, obsolete inventories, and rejected unused stock. Recovered paper material, however, shall not include fibrous waste generated during the manufacturing process such as fibers recovered from waste water or trimmings of paper machine rolls (mill broke), or fibrous byproducts of harvesting, extractive or woodcutting processes, or forest residue such as bark (NERC, 1988).

While this consensus does represent progress for some legislative purposes relative to procurement standards, there yet remains a problem of the generic use of the term "recycled" in other settings. The Coalition for Recyclable Waste is currently conducting a letter writing campaign, encouraging consumers to protest the labeling practices of the greeting card company, Recycled Paper Products, Inc. This company uses display cases with its name, and also prints its company name, on the back of cards that are of glossy, non-recycled stock. Although the first cards printed by this company when it was first founded were on recycled stock, the company maintains that consumers do not care whether the card stock really is made of recycled paper. As a consequence of this campaign, the company is engaged in a search to identify a source that can supply a glossy recycled card stock. At present, this is not produced by any American paper mill.

Standardized labels that represent the sanctions of an official or expert body promise a safe avenue for marketers to experiment with promoting recycled content. However, there are exceptions, where a few companies are doing this on their own. One such company, Overseas Marketing of Tinsdale, California, is willing to share advice on how that company uses a recycled content label on its corrugated paper cartons. The President, Irv Wieder, explains that the carton is stamped: "Made from tested recycled materials," for several reasons. First, this is to explain why the color of the carton differs from that which customers are accustomed to. Second, Wieder believes that the word "tested" is a term that customers are very familiar with, and that it conveys reliability and trustworthiness. For overseas customers, in particular, he believes that the word "tested" carries connotations of America's best qualities of production, as in "Tested by Underwriters' Laboratory" (Wieder, 1989). However, the testing should be based on agreed-upon procedures. American Society of Testing Materials (ASTM) regularly meets to research and develop performance standards for a wide range of materials.

The key to successful marketing of recycled content could be to de-emphasize its associations with solid waste and to build, instead, stronger associations with the more attractive concepts of ecology, sustainability, future resources, Mother Nature, etc. This also underscores the importance of establishing a universal seal or symbol that could be broadly applied to all kinds of products and packaging rather than simply declaring recycled content on a label. A graphic symbol or seal could also lend itself to more forceful and attractive presentation in a national advertising and promotion campaign aimed at consumers.

There is good precedent for this approach. Canada has just launched a program to award the use of an "environmentally friendly products" logo to approved products and packaging (Stoops, 1989; and McMillan, 1988). This program is based on a similar concept in operation in West Germany (the Blue Angel program) since 1978. The winning design in a national competition for the Canadian logo showing three intertwining doves in the outline of a maple leaf represents the cooperating sectors of consumer, industry and government (see Exhibit 6).

This theme of cooperating sectors is consistent with the way in which product evaluations need to be made, to determine which products and packaging will be eligible to use the logo. The review and selection process involves an independent association equivalent to a U.S. Underwriters' Laboratory, non-profit public interest consultants, and government representatives. Similar concepts for the use of a symbol or seal are being proposed in the U.S., as part of an environmental organization's environmental shopping campaign, in educational brochures by state and city governments, and as part of proposed legislation for RCRA reauthorization (The Waste Minimization and Control Act of 1988).

VII. Conclusions

A. Major Findings

Many of the projects reviewed for this study started their consumer education and promotion campaigns without the benefit of guidance and experience from prior projects. This study found several consistent themes in the projects and research reviewed which should be useful in designing similar programs and planning future research. The findings are suggested from examining strategies that were effective in stimulating household demand for products and packaging that promote source reduction and recyclability. The effectiveness of consumer education programs can be enhanced if the principles listed below are followed:

- Attention-getting techniques for consumer education programs must compete with other advertising. To be successful, these educational programs must be of high quality and as sophisticated as other advertising in targeting appropriate messages to various audiences.
- Long-term changes in consumer behavior depend upon changing basic consumer attitudes and motives. Consumer education programs should not be limited to short-term, non-durable incentives but should be combined with self-sustaining motivation (having long-term durability).
- Household consumer education programs should make consumers feel that their participation will be a positive contribution to the solution of an important problem.
- In order to increase product choices available to consumers, upstream decision-makers, such as manufacturers and product and packaging designers, must be educated about the desirability of source reduction and product/packaging recyclability as well as the economic and image enhancement.
- Definitions, labeling, and other important messages must be standardized, simple, and well publicized, so that they are readily recognized and understood by consumers.

In addition, there are several important factors that affected the effectiveness of the store- and community-based education programs reviewed for this study. These include:

- Strategies designed to change purchase behaviors and attitudes are more likely to gain consumer acceptance and achieve lasting changes in buying habits.

- The quality and content of consumer education and promotional activities affect how the message of the program is received by the target audience(s). The promotion must grab the attention of consumers and leave them with a sense of wanting to help solve the MSW management crisis.

- Involvement of different interest groups helps to establish credibility and support from groups as diverse as concerned consumers, grocery store management, the department of public works, and industry. Involving several groups into the program pools together resources (e.g., labor, funding, access to advertising, endorsement) and expands support to a wider audience.

- Cooperation of retailers is critical for store-based promotional campaigns. Efforts to change purchase decisions are most effective when community-based education is complemented by point-of-purchase information and reminders in the store. Cooperative retailers should be recruited prior to start-up. Promoting the program to retailers should emphasize the benefits (e.g., enhancing store image, avoidance of disposal costs if linked with new recycling activities, and outside sources of financing).

- Development of programs designed for the long term is essential if consumer-based programs are to contribute to mitigating the MSW management crisis. Only by permanently changing purchase behaviors can we move towards closing the recycling loop by stimulating demand for products made from recycled material and reduce generation of MSW destined for disposal. Long-term funding, effective feedback of audience responses, and adaptability are three key elements for a program's longevity and success.

This study's assessment of marketplace initiatives revealed that, while little has been done to date, consumers, government, and industry can contribute to improving the availability of, and demand for, products and packaging promoting source reduction and recyclability.

- As consumers become increasingly aware of the range of environmental consequences of their purchase decisions (e.g., resource depletion, exhausting waste disposal capacity, introduction of potential hazards into the environment during production and disposal, endangerment of wildlife, and loss of esthetics due to litter), they will likely select products with fewer environmental impacts (also depending on the Four P's). Astute marketers can take advantage of the popularization of environmentalism by offering acceptable alternatives that satisfy this consumer concern. Different levels of government and interest groups can participate in educating consumers to help them make environmentally beneficial product and package choices.

- Cause related marketing enhances a product's or package's image by linking their purchase with a social cause. Frequently, marketers are linking their products and packaging with environmental causes, thereby increasing consumer awareness of environmental problems and leveraging financial support for environmental programs. Cause related marketing could also be used to promote source reduction and recycling activities.

- Environmental shopping and letter writing campaigns may be effective in reducing the amount and toxicity of post-consumer materials. Environmental shopping campaigns are being used in a few states, localities, and national organizations to educate consumers about the environmental consequences of their purchase decisions and guide them in selecting products and packaging with fewer environmental impacts. Typically, environmental shopping guides contain information about product toxicity, overpackaging, recyclability, and desirable substitutes and alternatives. Letter writing campaigns have been used to focus consumer and media attention on selected products and packaging which a group views as desirable or undesirable. After one such campaign in 1987, a plastic-aluminum can was withdrawn from the market by two soft drink manufacturers.

- Standardized labeling can be used to accomplish a variety of goals: to educate and encourage consumers to buy products and packaging with source-reduced or recycled content, to identify source-reduced, recycled, or recyclable materials used in consumer products and packaging, and to create incentives for manufacturers to introduce and gain recognition for products and packaging that promote source reduction and recyclability. Canada has begun a program where products may be submitted for testing and certification as "environmentally friendly." It is important that all affected parties (including consumers, industry, retailers, government, and academia) be involved in the standard-setting process to ensure feasibility and support for these types of programs.

B. Program and Policy Needs

What is the current picture? Although there was some federal funding of consumer education projects during the 1970s, much of the recent work has been carried out at the local level either by environmental coalitions or municipal or state authorities. At present, states, localities, environmental groups, and industry are developing consumer education strategies to meet their concerns as the need arises. Twenty-four states have initiated some type of "buy recycled" program (Andress, 1989). These programs are aimed at state procurement guidelines and, in several cases, at household consumers as well. Several states and coalitions are developing environmental shopping guides which will provide listings of products and packages that are considered safer for the environment and will, in some cases, provide information on product availability. Michigan is facilitating meetings between manufacturers/packagers and consumer groups so that each can hear the other's concerns. In addition, several manufacturers are now taking advantage of consumer concerns about the environment by marketing products as "safe to the environment," "containing recycled materials," or "recyclable." Each of the major players involved could benefit from clear policies concerning source reduction, recycled content, and recyclability, and standardized definitions of terms related to product content and attributes.

C. Activities for Industry, Federal, State, and Municipal Governments:

1. Conduct research to generate information about performance, appearance, and marketing advantages of products and packaging that promote source reduction and recyclability. This research could include confidential surveys of industry and actual performance testing of products and packages

2. Examine procurement specifications of products and packages that could be made from recycled content. Modifications may be made to specifications, based on results of research regarding performance. The American Society of Testing Materials has convened a committee to consider whether modification of performance specifications is needed to permit inclusion of products and packages with recycled content.

3. Disseminate information about performance, appearance, and marketing advantages of using products and packaging that promote source reduction and recyclability. The appropriate federal agencies could engage in a joint effort to promote a "Buy American, Buy Recycled Campaign." In doing so, it would be most effective to use existing intermediaries to communicate with businesses and industries: trade associations, trade journals, and trade conferences. Data can be presented regarding the character and dimensions of the MSW magagement crisis, research about model initiatives, and updates on the kinds of regulatory and legislative initiatives being proposed at every level of government. This should be done by publishing information and editorials, establishing an information clearinghouse, and by presenting information at industry conferences.

   The kinds of publications to be targeted may be characterized by type of readership and circulation. In general, there are several major arenas suited to this effort: publications for marketers, which would include new product and packaging designers, advertising agencies and media consultants; academic journals whose readers consult for, or whose publications are read by, marketers; publications aimed at specific packaging industries; and the mainstream business press.

Publications for market researchers, marketers, and academics include:

Academy of Marketing Science
American Association of Advertising Agents
American Marketing Association
Association for Consumer Research
Journal of Advertising
Journal of Advertising Research
Journal of Marketing
Journal of Marketing Research
Journal of Consumer Research
Marketing News

Industry trade association publications include, for example:

Beverage World
Fibre Market News
Packaging Magazine
Packaging News Packaging Digest
The State Reporter (Society of the Plastics Industry)

The mainstream publications cited as most important by several market experts include:

Advertising Age
Ad Week
Barron's
Forbes
Fortune

Likewise, each of the industry and academic groups offer opportunities for direct interaction through trade association meetings, seminars and conferences. Some of these forums for presentations include, for example:

The Industrial Design Society of America
The Package Design Council
The Ryder conference for industry packager
Society of Consumer Affairs Professionals conferences
The Stanford Design Conference sponsored by Stanford University

4. Offer awards for innovative use of recycled content and for innovative design of source reduced and recyclable products and packaging. A competitive awards program could be developed for innovative, environmentally friendly products and packages and practices. For example, the American Institute of Graphic Artists sponsors an annual competition among product and packaging designers. For example, the Department of Energy sponsored an energy efficient design competition in 1980.

5. Support standardized labeling (e.g., logos, symbols, wording) for products and packaging that promote source reduction and recyclability. Marketers stress that consumers need a simple and reliable means to identify these products and packaging. From the marketers' point of view, it may be less risky, at least in the near term, to advertise a product or package as "environmentally friendly" rather than use terminology that specifically refers to recycled content. The use of the term "recyclable" will not be valuable unless its use reflects a consensus agreement among environmental, government, industry, retail, consumer, and academic experts.

6. Foster data collection to track use and purchase of recycled materials. The U.S. Department of Commerce conducts an annual census of manufacturers. If each industry were also required to quantify its use of recycled materials for the census, this would provide a means to evaluate and publicize the success of various kinds of initiatives to encourage use of recycled materials. In addition, measuring the effectiveness of consumer-oriented education programs will provide a basis for revising and improving such programs.

7. Share information about procurement practices. Publicize accomplishments in procurement of products and packaging that are source reduced or contain recycled material. With participation of state agencies, a national computerized on-line database of procurement transactions could be maintained. Product specifications, quantities, prices and markets could be posted continuously. Reading of information could be open to all levels of government, industry and the public.

   An American business now is marketing "The Official Recycled Products Guide, (RPG)" (Boulanger, 1989). More than 200 companies are already expected to have listings in the catalog. The approval criteria for products to be listed are based on definitions of recycled content found in the Resource Conservation and Recovery Act, or those recently agreed to by the Northeast Regional Council of Governments (NERC). Listings are free. Subscriptions include quarterly updates.

8. Use new marketing strategies to develop an aggressive, broad-based public education program to build awareness and acceptance of recycled content. Recognize that different techniques are needed to reach different segments of the marketplace. Identify and target particular segments of the audience, and develop strategies accordingly.

   Prepare a comprehensive, business-like plan, comparable to product marketing strategies. William D. Novelli (1986) wrote a chapter "Nonbusiness or Social Marketing," for the Handbook of Modern Marketing offering advice on how to structure such an effort. He advises that such a plan must avoid these four "L's" which generally characterize marketing for social causes: low visibility, lamentable budgets, little research, lack of continuity.

Give the image of recycled content a facelift. In a book of advice entitled What They Don't Teach You in Harvard Business School, Notes from a Street Smart Executive, the importance of imaginative advertising is explained with an apt example. Author Mark McCormack (1985) observes that sushi restaurants would never have become popular if they were simply called "places to eat cold dead raw fish."

9. Promote buy-recycled programs at the point of sale. Surveys that find consumers approving of recycled and recyclable products and packaging may be biased by the social context of the interview; there is a tendency to give socially acceptable responses to the interviewer. However, it is at the point of purchase that the decision is made, and at that point many other motivations (convenience, attractiveness of the product, price, etc.) may override the expressed preferences for recycled material. For this reason, promotional strategies must be linked to the act of purchasing products and packaging. The use of an easily recognizable and understood universal symbol or slogan is recommended by marketing experts for this reason.

10. Support research. Further (economic, technical, and socio-behavioral) research is needed to demonstrate the societal benefits of recycling. Such research should include improving understanding of the complex marketplace inter-relationships among consumers, industry, and government, in order to better design strategies to promote source reduction and recyclability. In addition, community-based pilot projects offer the opportunity to apply and refine research findings in real world settings.

D. Activities for Consumers:

1. Purchase products and packaging promoting source reduction and recyclability.

2. Conduct or participate in Environmental Shopping campaigns.

3. Write manufacturers about preferences and dissatisfactions. All marketing experts interviewed for this report, both academic and professional, emphasized the reactive nature of the marketplace and the sensitivity of manufacturers to communications from consumers. However, communication at the point of purchase may not be effective; concerns should be conveyed directly to the maker of the product.

4. Review and comment on industry and government proposals for labeling schemes.

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Appendix A

ANNOTATED BIBLIOGRAPHY

A.1 CASE STUDIES
A.2 SURVEYS
A.3 RESEARCH REPORTS AND POLICY PAPERS
A.4 CURRENT EVENTS
A.5 EDUCATIONAL AND RESOURCE MATERIALS

A.1 CASE STUDIES

Conservation News, 1976

Environmental Action Foundation, 1976

Gallager, S.M., 1984

The Hoosier Purchasor, 1970s

Palo Alto Material Resource Recovery Program, 1970s

Peto, P.A., 1988

Red Owl Stores, 1973

The San Diego Ecology Centre, 1982

U.S. Environmental Protection Agency, 1975

U.S. Environmental Protection Agency, 1970s.

Conservation News, "Red Owl: One Store's Attempt at Recycling," Vol. 41, No. 2, January 5, 1976, p. 13.

Environmental Action Foundation, Implementing Waste Reduction at the Supermarket, 1976.

Red Owl Stores, "Bring 'Em Back, Repack and Save," Final Report, September, 1973.

U.S. Environmental Protection Agency, "Source Reduction Fact Sheet: Red Owl Stores Program,: Reducing Waste at its Source, 1970s.

Twelve Red Owl Stores in Wisconsin began the "Bring 'Em Back, Repack and Save" program during the summer of 1973 to promote the sale of reusable containers and the use of bulk dispensers. Red Owl was responding to customer concerns about the environment in the midst of the energy crisis. For each container reused, the customer received a cash refund (a sticker identifying a container as reusable was provided at the time of original purchase) at checkout equivalent to the store's cost of providing a new container.

Reusable packages included in the promotion were:

- egg cartons (3 cent refund per container);
- milk and soda containers (4 cent refund per container);
- checkout paper bags (2 cent refund per bag); and
- reusable checkout plastic shopping bags (25 cents each to purchase and 2 cent refund for each reuse).

The conclusions drawn from the program included:

- the program was dependent on advertising (promotion was incorporated into the stores' regular advertising);
- program participants needed constant reminders through advertising;
- it was important that the store showed enthusiasm;
- in-store promotion was essential;
- the greatest consumer appeal was cost savings, though they also approved of the environmental goal to conserve natural resources;
- even non-participants liked the idea of the program;

- it cost the stores very little since consumer refunds were equivalent to the stores' cost of the packaging material and the advertising cost was incorporated into the stores' newspaper advertising program; and
- many consumers were confused by the number of items included in the program.

The Environmental Action Foundation (EAF) made several recommendations based on an examination of the program. The selection criteria for reusable packaging should include the following factors: ease of implementation (for stores and consumers); security (to prevent increased theft of bulk items); sanitation; and product protection. EAF felt that programs with a limited number of products to be reused would be the most effective. They concluded that a simple program (e.g., one which reused only egg cartons and grocery bags) would be more understandable to the consumer and would receive higher levels of participation than a program which reused many containers.

Suggestions concerning other aspects of the reuse program included:

- products in the preferred package need to be available;
- store personnel should have a thorough understanding and be enthusiastic about the program;
- there needs to be a simple and effective method by which consumers can identify reusable packaging and containers;
- programs need to make use of free media publicity and in-store promotion of packaging reuse; and
- it is important to incorporate self-evaluation into program design.

Gallager, S.M., Shelf Labeling: Packaging Regulation For Oregon, Portland State University, 1984.

This case study examined "the proposed introduction of shelf labeling for packages in Oregon stores as a means of controlling waste production and recycling." Shelf labeling legislation would require that a label be placed on the grocery store shelf below each item, indicating whether the item is reusable, made of recycled or recyclable materials, or is difficult or impossible to recycle. The paper discusses three voluntary shelf labeling programs.

1) The American Paper Institute's "Gray Is Beautiful" campaign to promote the use of recycled (gray) paperboard was adopted by the Women's Clubs of America in the 1970s and continues today. It had received much media attention, but no formal review as of 1985.

2) In the 1970s, a similar campaign, called the "Packaging Labeling Program," was tried in Palo Alto, California, with the support and assistance of the city government (discussed in greater detail below -- PAMRRP, 1970s). It included a large public awareness campaign both inside the selected stores and in the local media. The program also included a city-sponsored effort to increase recycling. The program produced no change in shoppers' purchasing habits, and little increase in recycling as a whole. The program's coordinators responded by calling for more publicity and an expansion of the program into all the city's supermarkets (rather than just four CO-OP supermarkets).

3) In San Diego, California (1981), the California Waste Management Board commissioned a shelf labeling program, which was implemented by the San Diego Ecology Centre (discussed in greater detail below -- SDEC, 1981). The program took place in area Safeway grocery stores, and included an education campaign with a "buy recycled" message on buttons, posters, and grocery bags, labeling of recycled paperboard content on egg cartons, and identification of products with recycled packaging on shelf labels. Over two thousand consumers were surveyed before and after the program to determine if it had increased their awareness of recycled packaging. Most survey participants said that, not only did they not recognize the recycle symbol used in the program, but they were also unaware that the program had even occurred. But survey participants did indicate that they would prefer to buy products in recycled packages if they were of the same quality and price as those packaged in virgin materials.

In discussing shelf labeling, the author compared it to other legislative mechanisms, such as taxing packaging manufacturers and users based on the amount of recycled material they use, or restricting the kinds of packaging that can be used. This latter technique, known as design restriction, was passed into law in Minnesota in 1973, and required that all new packaging designs, as well as changes to existing designs, be approved by a regulatory board. However, the review process was never initiated because it was considered too complicated. The paper also discusses government positions on shelf labeling, and opposition to too much labeling from retail grocery stores, container manufacturers, consumer groups, and packagers.

The Hoosier Purchasor, "The Consumer Push Is On Toward Recycled Paperboard," 1970s, p. 5.

This article summarizes a program of the Chatham, New York Women's Club promoting the purchase of products packaged in recycled paperboard by holding a contest to see who in the community could turn in the greatest number of individual product proofs of purchase with the characteristic gray color or with the recycled logo. The contest was aimed at housewives. Incentives and prizes were not mentioned in the article. This was part of the American Paper Institute's "gray is beautiful campaign." Club members also wrote letters to manufacturers whose products could potentially be packaged in recycled material to urge them to change their packaging practices. Participation, generated primarily by peer promotion, was reported to have been very successful. It is interesting to note that the program was designed with the help of The Brown Company, a nearby paper manufacturer. Both the General Federation of Women's Clubs and the National League of Women Voters promoted the campaign nationally.

Palo Alto Material Resource Recovery Program, "Report on Packaging Labeling" and other materials, 1970s.

This is a collection of materials (report, press release, poster, sample questionnaire, and fact sheet) associated with the efforts of Palo Alto, California to reduce the amount of MSW generated by households in the community. These materials were designed to encourage grocery shoppers to become more aware of product packaging materials. The six-page report summarizes the three-month Package Labeling Program (PLP) undertaken in the 1970s by town officials, a chain of four CO-OP grocery stores, and the Community Association for the Retarded. Color-coded stickers rating the packaging material (refillable, recyclable, and costly to recycle) were affixed to all shelves containing wine, beer, and soft drinks. A news conference and in-store posters were used to further increase public awareness.

While the program measurably increased shopper awareness of recycling, significant changes in purchases had not yet occurred, though it was thought premature to make any firm conclusions. One significant finding was that if such a program is to be maintained without demonstration project funding (this project was partially funded with a small EPA grant) and expanded to other supermarkets within the community, the PLP must demonstrate that the program costs passed on to participating supermarkets are not substantial. The Palo Alto program depended upon volunteer labor and other resources from the city. A series of in-store surveys showed that while shoppers became more aware of recycled content and recyclability, there was no significant change in their product selection. Consultants to the PLP felt that shopping behavior would not change until shoppers' attitudes about their contribution to the MSW problem were altered. Suggestions for future work included holding forums with packaging manufacturers and reducing program costs by incorporating the recyclability rating on products' unit price stickers rather than applying separate stickers to every shelf.

Peto, P.A., "Composting in Paper Bags," Waste Age, May 1988, pp. 73-75.

This article examines an experiment conducted in Essex County, New Jersey, during the fall of 1985. The experiment was designed to determine whether leaves could be successfully composted in biodegradable paper bags and to judge household acceptance of this alternative to plastic bags. The paper bag's composting ability was found to depend on the biological activity of the composting pile. The study determined that the public was pleased with the quality of the paper bags, although they wanted a better system for closing them. Participants considered the paper bag a desirable substitute (because of its degradability) for regular plastic bags if prices were comparable. However, the unsubsidized price of paper bags was three times greater than the price of plastic lawn bags. Obviously, this would lower demand for such a product.

The author estimates that if the cost savings associated with composting leaves were considered (i.e., disposal costs avoided by the community), there would be a community savings associated with using the paper bags. The additional cost of using plastic bags is due to the manpower required to break open the bags and dump out leaves before composting.

The San Diego Ecology Centre, Environmental Shopping/Solid Waste Awareness Project, Final Project Report and Executive Summary, California State Solid Waste Management Board, December 1982.

The Environmental Shopping/Solid Waste Awareness Project (ES/SWAP), also called the Recycled Packaging Awareness Campaign, was funded by the California Solid Waste Management Board and implemented by the San Diego Ecology Centre. The project was active from July 1981 through December 1982 in nine San Diego Safeway stores. It followed the Von's grocery stores' Environmental Shopping Campaign of 1981. The project had three main objectives: increase shoppers' awareness of the recycle symbol and products packaged in recycled materials; inform shoppers of the important contribution that recycled packaging makes to resource conservation; and determine if programs such as ES/SWAP increase consumer awareness of recycled packaging. The program sought to use the supermarket as an "environmental classroom" by placing markers and signs in supermarkets to identify products packaged in recycled materials. The program also made use of store worker badges which explained the recycle symbol, and bags imprinted with an environmental shopping message. In addition, the program took advantage of news coverage of the program on television and in newspapers.

A questionnaire interview was the primary method for evaluating the program. Two thousand three hundred pre- and post-program interviews were conducted. No statistically significant difference was found between the responses of consumers before (pre-program) and after the program took place (post-program), nor were the responses of consumers at the store where the program took place (program store) different from consumers at stores that did not participate in the program (control store). Ninety percent of the respondents (before and after the program, in program and control stores) felt that using recycled packaging would help to reduce solid waste disposed. Ninety percent of the respondents replied that all things being equal they would prefer to buy products packaged in recycled materials. Eighty percent strongly agreed that a recycle symbol should appear on the outside of all containers made from recycled materials. Only 31 percent strongly agreed that consumers should pay higher prices for products that "pollute the environment." Forty-one percent of the pre-program and 51 percent of the post-program interviewees responded that they had seen the recycle symbol, but only 21 percent of pre-program and 28 percent of post-program respondents were able to identify the symbol's meaning correctly. Most respondents identified mass media as the method of promotion in which they had seen the recycle symbol. Only 7 percent of the post-program respondents had seen anything about an environmental shopping campaign in their respective supermarkets.

The San Diego program suffered organizational problems which may have led to the minimal increase in awareness. These included: inadequate number of store signs (2 - 6 per store though 10 were produced); store managers permitted only a lower number of recycled package markers to be applied to the shelves to reduce the clutter on the shelves (100 - 200 per store, although 800 were projected); inconsistent cooperation of store employees; and late arrival of promotional materials. Furthermore, the program's evaluation was muddied by the fact that the control stores also used shopping bags and egg cartons with recycle symbols on them. These problems were compounded by a new store policy of emphasizing only one theme in the window display at a time and hanging posters in obscure places in the store.

U.S. EPA, "Program of International Paper Company and Wells Dairy, Reducing Waste at Its Source," May 1975.

International Paper Company redesigned the half-pint milk container in an attempt to conserve resources. Wells Dairy of Lemars, Iowa began using the containers in a 5-month test starting in February of 1974. The slimmer milk carton used 31 percent less paper and 16 percent less plastic coating than the traditional half-pint container. Manufacturing these cartons also resulted in reduced energy use and pollution; they are also less costly to transport. The package tested very well; a number of school systems found it economical (it costs less) and convenient.

A.2 SURVEYS

David A. Meeker & Associates, Inc., 1988
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Mikitka, K.F., 1987
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Modern Brewery Age, 1984
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Public Response Associates, Inc. 1981
Resource Recycling, 1986
Robert Marston and Associates, 1988

David A. Meeker & Associates, Inc., "Environmental Public Relations Survey," October, 1988.

During August and September 1988, David A. Meeker & Associates conducted a survey of Fortune 500 industrial companies (i.e., firms subject to Superfund Amendments and Reauthorization Act Title III chemicals reporting requirements) located in the Great Lakes and western Pennsylvania regions. Overall, sixty-seven companies participated. The objective of the survey was to "[d]etermine current attitudes and practices of top corporate communicators on environmental issues."

Two general conclusions are drawn from among the survey responses:

"1. Environmental public relations, regardless of its percentage of overall communication activity, is extremely vital and likely to grow in importance during the next few years.

2. There exists a wide range of opinion on how best to handle environmental PR efforts" (e.g., proactive versus reactive, low-profile approaches).

One of the comments from a respondent was as follows: "There just seems to be no avoiding the fact that environmental issues are going to be of increasing concern. The level of public awareness is starting to take off again."

Erickson, G., "Consumers Get Tough With Packaging," Packaging, June 1988.

This article summarizes a 1988 nationwide survey of 756 consumers who were asked 44 questions concerning packaging. One section of the questionnaire dealt with the issue of recyclability of packaging.

A question in the survey for three consecutive years has been "How important is recycling to you?." Responses to this question have remained fairly constant over the years with roughly 30 percent of the respondents reporting that recycling was "extremely important" to them, 50 percent reporting that it was "somewhat important," 15 percent reporting that it was "not very important," and 3 percent reporting that it was "not at all important." Between the 1986 and the 1988 Packaging surveys, the number of respondents who claimed that they "often" or "sometimes" considered the recyclability of packaging material when making a purchase rose from 36.2 percent in 1986 to 48.4 percent in 1988.

Consumers were asked how hard they thought it was to recycle different materials. Consumers in the following percentages replied that a material was "very easy" or "easy" to recycle: aluminum (83.9 percent), paper (75.0 percent), glass (55.4 percent), steel (40.5 percent), and plastics (37.3 percent). The survey also questioned consumers about which industries they thought were doing a good job of recycling. Respondents gave industries the following percentages of "very good" and "good" ratings: aluminum (73.7 percent), paper (52.9 percent), glass (46.6 percent), steel (29.9 percent), and plastics (25.4 percent).

Mikitka, K.F., "Recycling Symbol Research," Resource Recycling, Vol. VI, No. 5, September-October 1987, pp. 32-34, 47.

This article describes current field studies and a survey conducted by San Diego State University which are follow-ups to the San Diego County "Environmental Shopping" and "Shopping for the Symbol of the 80's" promotion and education campaigns. The survey's objective was to measure the correct identification of the "chasing arrows" recycling symbol and to obtain profiles of household consumers and those who recycle. The survey was conducted at two shopping centers and two recycling centers in San Diego County. While 44 percent of the respondents had seen the recycling symbol, only 31 percent of them (34 percent of recycling patrons and 28 percent of the shoppers) could define its meaning. This significant increase over the 12 percent recycling symbol recognition rate of 1982 in San Diego County was attributed to the educational and marketing programs aimed at creating recognition of the recycling symbol and awareness of its meaning.

The survey found no significant differences in the recycling rate based on different social class categories. However, there is a difference in terms of reasons why people recycle. It was found that individuals with higher incomes are more likely to recycle for ecological reasons and individuals with lower incomes are more likely to recycle for monetary reasons.

Mikitka, K.F.; A. Gross; and J. Zeitler, "Recycling Symbols," Resource Recycling, July/August 1984, pp. 16-18.

This article discusses the importance of developing a standard symbol which connotes recycled content or recyclability. Symbols allow for a quick understanding of packaging. In order for recycling symbols to be credible, standards need to be established as a prerequisite for using the symbols. A survey of 600 people, conducted by a public relations firm for the California Waste Management Board in 1981, found that 90 percent of consumers believe that the recycling symbol ought to appear on packages which are made from recycled materials, and 81 percent of those polled would prefer to purchase items packaged in recycled containers if all things, including price, were equal.

Modern Brewery Age, "Gallup poll shows Americans buy recyclable containers," July 4, 1988, p. 4.

The Glass Packaging Institute commissioned the Gallup organization to conduct a survey concerning the use of recyclable packaging. Fifty percent of Americans surveyed said that they would change their purchasing habits to buy foods and beverages sold in containers that are or can be recycled. Preference for recyclable packaging increases with household income. Sixty percent of Americans with incomes over $40,000 said that they would switch to a product in a recyclable container. No mention was made of price considerations. Lewis D. Andrews, President of the Glass Packaging Institute, said that more glass containers currently have greater than 25 percent recycled content, and they hope that this will rise to 50 percent.

National Solid Wastes Management Association, "Public Attitudes Toward Garbage Disposal," 1988a.

This report summarizes three surveys conducted for the National Solid Wastes Management Association by Cambridge Reports in 1988. These surveys included a telephone poll of 1,500 adults in February, telephone interviews with 500 "opinion leaders" in March, and face-to-face interviews with 1,500 adults in July and August.

In the February and March polls, respondents, asked to rank the importance of issues facing local officials, placed solid waste disposal third, behind improving education and providing affordable housing. In the July and August surveys, solid waste disposal was ranked as the second most important problem facing local officials, second only to improving education. In the northeastern region of the U.S., solid waste disposal was ranked as the most important issue facing local officials. Respondents were also asked whether they favored or opposed siting new landfills or waste-to-energy plants. Neither of these options was favored, although landfills were more strongly opposed. The median response to the question, "What percentage of waste can be recycled?" was 44 percent. When asked, "How should recycling programs be paid for?," 24 percent of the February respondents felt that there should be taxes on packaging and nonrecyclable materials. In the July and August surveys, 41 percent felt that recycling should be paid for by taxes on packaging and nonrecyclables.

Public Response Associates, Inc., A Report of a Survey Conducted for: The California State Solid Waste Management Board, California State Solid Waste Management Board, July 1981.

California State Solid Waste Management Board, in conjunction with the American Paper Institute, Von's Grocery Stores, and the Charter Oak Women's Club, ran an environmental shopping campaign in 1981. Flyers were inserted in grocery bags during checkout and packaging containing recycled materials was marked. Public Response Associates conducted a survey in order to test the effectiveness of the campaign.

Six hundred customer interviews were conducted after the program had been completed in selected stores, 400 from the two stores participating in the program (program stores) and 200 from the store that had not taken part in the campaign (control store). Consumers received information about Von's environmental shopping campaign from a variety of sources: in-store signs (38 percent); newspapers (35 percent); radio and television spots (35 percent); and grocery bag stuffers (16 percent). In-store signs, newspaper advertising, and radio and television promotion appeared to be equally effective in getting the program's message to shoppers. Flyers placed in grocery bags were a relatively ineffective tool for promoting the message. Sixty-five percent of all respondents felt that California was facing a garbage crisis. Significantly more shoppers in the program stores indicated this perception than in the control stores (71 percent versus 51 percent). Forty-nine percent of the respondents shopping at program stores recognized the recycle symbol; thirty-two percent of the control respondents recognized it.

Of those who had seen the recycle symbol before, 87 percent of shoppers at the program stores and 77 percent of shoppers at the control stores could correctly identify its meaning. Of those program-store respondents who had seen the symbol, 45 percent mentioned seeing it promoted in supermarkets and 34 percent mentioned seeing it in the supermarket (17 percent) or on packaging. Fewer of the control store respondents reported seeing the symbol in the supermarkets (17 percent) or on packaging (16 percent).

Summary statistics were available only from the combined responses from all stores: (1) 90 percent of respondents felt that the recycle symbol should appear on recycled packaging; (2) three-quarters of the respondents would think better of a company using recycled material; (3) two-thirds of the respondents felt people should be required to separate recyclables from garbage; (4) nearly 60 percent of the respondents preferred to buy products in containers made with recycled materials; and (5) over 55 percent of the respondents felt that business should use recycled materials even if consumers would have to pay slightly higher product prices.

Resource Recycling, "Shoppers favor recycled paperboard," Vol. V, No.2, March/April 1986, p. 42.

In a survey by ShopRite supermarkets and the American Paper Institute, thousands of ShopRite customers were interviewed and indicated their endorsement of recycled paperboard packaging. The important findings included: 93 percent of those surveyed thought favorably of recycled paperboard packaging; nearly 83 percent of those surveyed believed that manufacturers should label recycled paperboard packaging with the recycling symbol; 71 percent claimed they would shop for the recycling symbol if it meant that it would decrease the amount of solid wastes sent to landfills; and approximately 81 percent stated that they had taken newspapers to a recycling center within the past year.

Robert Marston and Associates, "Americans Agree: Troubled Environment is an Election Issue," Press Release, October 1988.

This nationwide survey conducted by Penn & Schoen Associates questioned 1,000 Americans about solid waste management problems. Eighty-eight percent of those surveyed felt that solid waste disposal was an important issue. Ninety percent felt that recycling and biodegradability will help to alleviate the problem of solid waste, and 91 percent of the respondents would pay a few cents more for product packages which were recyclable and biodegradable. Eighty-seven percent felt that the government should provide incentives for manufacturers to use recyclable and biodegradable packaging.

A.3 RESEARCH REPORTS AND POLICY PAPERS

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Geller, E.S., 1989

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Geller, E.S.; J.B. Erickson; and B.A. Buttram, 1983

Geller, E.S. and G. Lehman, 1986

Hurst, K. and P. Relis, 1988

Katzev, R.D. and A.V. Pardini, 1987-88

Kinnear, T.C. and J.R. Taylor, 1973

Kinnear, T.C.; J.R. Taylor; and S.A. Ahmed, 1974

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Mikitka, K., 1985

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Stern, P.C., 1984

Tracy, A.P. and S. Oskamp, 1983 - 84

Warkov, S., 1983

Arthur Young & Company, Factors Which Inhibit the Demand for Secondary Materials; Phase I Marketing Report, California State Solid Waste Management Board, November 2, 1981, pp. 24-25.

Only two pages of this study were received from the California State Solid Waste Management Board. The study concluded that competitors among oligopolistic industries tend to make very similar products. Using recycled products would differentiate one company's product from another's. An "environmentally conscious segment of the population" would find a recycled product appealing. However, using "recycled" in advertisement for personal hygiene products or durable products may have negative effects.

Becker, B.W., "Using Consumer Issues for Competitive Advantage," Business Horizons, Vol. 24, No.3, 1981, pp. 43-47.

This article reports that "consumer concerns need not be threats to business. Viewed imaginatively and analytically, consumer issues can become part of a firm's marketing strategy to obtain competitive advantage." Becker develops a "consumerism opportunity matrix" that incorporates a variety of consumer issues and offers four marketing decision variables within control of management: changes in the product (including packaging); changes in price (marketing a recycled product as a cost competitive alternative); changes in location (marketing recycled products in high-demand areas); and promotion of the relative advantages of a recycled product. Two promotional strategies are provided: making a positive statement about a company's response to consumer concerns (e.g., advertising the removal of fluorocarbons from aerosols), and goodwill gestures that show company concern but do not directly relate to the product (e.g., donations to charity). Several examples of the successful marketing of products that promote source reduction or recyclability are provided: the marketing of high quality recycled writing paper by Bergstrom Paper Company and Simpson Lee Paper Company; elimination of fluorocarbons from aerosols by S. C. Johnson Company; reuse of containers at Red Owl stores in Milwaukee; and Hunt-Wesson's campaign to buy and preserve eagle nesting land for each container label returned. The importance of determining consumer attitudes, designing marketing plans for market segments, and the need to measure a quantitative goal, such as packaging reuse rates in a community, are also discussed.

Bingham, T.H.; M.S. Marquis; P.C. Cooley; A.M. Cruze; E.W. Hauser; S.A. Johnston; and P.F. Mulligan, An Evaluation of the Effectiveness and Costs of Regulatory and Fiscal Policy Instruments on Product Packaging, U.S. EPA, 1974.

"This study provides an evaluation of the costs and effectiveness of two types of government policy instruments that may be used to influence the quantity and composition of consumer product packaging and the use of recycled materials in consumer product package manufacture. The policy instruments considered are a regulation requiring the use of recycled materials in packaging and several types of taxes on packaging. The analysis provides an initial basis for policy decisions regarding the desirability of these policy instruments as possible means for reducing the generation of packaging wastes, increasing the use of recycled materials in packaging manufacture, and reducing the natural resource utilization of packaging." (Abstract from document)

The study found that, among the policy instruments examined, taxes on packaging -- with or without exemptions for recycled containers -- induced the largest reductions in solid waste generation. However, a tax on packaging materials without the exemption was (1) substantially less effective than one on containers with an exemption in reducing raw materials consumption, and (2) ineffective in increasing the consumption of secondary materials.

Conn, W.D., "Consumer Product Life Extension in the Context of Materials and Energy Flows," in D.W. Pearce and I. Walter (eds.), Resource Conservation: Social and Economic Dimensions of Recycling, University Press, New York, 1977, Ch. 7, pp. 127-143.

Extending product life is considered a means to conserve natural resources, reduce environmental impacts, and lower costs of MSW disposal. However, Conn cautions policymakers that policies for extending the lives of consumer products should be designed very carefully, especially if these policies are supposed to also reduce the overall materials flow. Otherwise, results may be counterproductive. Furthermore, other factors besides a product's physical durability can affect its lifetime, not all of which are under the control of the manufacturer (e.g., consumer treatment of the product, consumer decision to repair or throw away the product, availability and pricing of spare parts, and second-hand markets).

Adding to the complications of predicting consumer behavior and determining the relationship between product lifetimes and materials flow, Conn points out that if extending product life results in a cost savings, consumers may purchase more products, possibly resulting in a net increase in materials flow. The author recommends that all of these and other related factors should be understood before policymakers move ahead.

Conn, W.D., "Product Design and Municipal Solid Waste," Journal of Resource Management and Technology, Vol. 16, No. 2, July 1988a, pp. 100-103.

The author provides several examples of product design attributes which can have a potentially significant impact on MSW disposal, e.g., durability, ease of disassembly, and the presence or absence of materials which can have a negative impact on product recyclability or treatment and disposal. It is also stated that product designers and manufacturers have little or no incentive to consider whether product design affects the following: rate of MSW generation; feasibility of recycling; and the human and environmental safety aspects of MSW handling and disposal.

Product charges and regulations are identified as approaches to get designers and manufacturers to recognize the relationship between their product and the MSW stream. However, to date, these approaches have not received wide support. The author proposes a third option: expand waste audits included in a subsidized technical assistance program for individual firms to not only focus on their manufacturing processes, but also on the fate of their products (i.e., after they leave the company), as well. At a minimum, this approach could make firms aware of the impacts of their products on the MSW stream (see above), and perhaps profitable waste-related design changes. As a goodwill gesture, firms may make changes in their product designs if positive impacts on MSW disposal would result.

Conn, W. D., "Reducing Municipal Solid Waste Generation: Lessons from the Seventies," Journal of Resource Management and Technology, Vol. 16, No. 1, April 1988b, pp. 24-27.

This study summarized the objectives (reducing costs of MSW management, reducing litter, conserving natural resources, reducing adverse environmental impacts, and removing market inefficiencies) and approaches (reducing quantity of material used per unit of product, increasing the lifetime of durable and semi-durable goods, substituting reusable products for single-use "disposable" products, and directly reducing consumption of material goods) to waste reduction. It also outlines available policy options: regulation; financial incentives; and measures to promote voluntary efforts. Voluntary efforts included education and public awareness programs, technical assistance, and, in some cases, face-to-face persuasion.

From the author's viewpoint, the lessons of the 1970s were: 1) there needs to be a consensus of goals at federal, state, and local levels; 2) source reduction/-reuse/recycling have been erroneously associated with a decrease in the standard of living; 3) most source reduction and recycling activities of the 1970s were a result of resource/cost savings measures and innovations captured by private enterprise; 4) regulatory controls receive limited public support, are difficult to administer, and interfere in the "free market;" 5) financial incentives offer the advantage of encouraging consumer behavior without requiring it, but there is great difficulty in finding a compromise between a tax or subsidy large enough to create a "visible" change in waste generation and a tax or subsidy that is politically acceptable, especially given the additional governmental cost of administration; 6) beverage container legislation was the most widely adopted waste reduction measure in the 1970s for several social, economic, and political reasons; and 7) encouraging a wide variety of voluntary efforts will continue to be the policy of first choice for most governments but raises difficult issues related to the level of intensity of government sponsored persuasion.

Conn, W.D., "Workshop on Waste Reduction, January 10, 1980: Summary of Proceedings," Prepared for California State Solid Waste Board, 1980.

Key points made at this workshop which relate most directly to this report occurred in the session "A marketing approach to waste reduction." Arthur Sterngold, President, Social Marketing Consultants, and Assistant Account Executive, Needham, Harper, and Steers Advertising, Chicago, Illinois, described the traditional approaches to changing consumer behavior (in his order): legal/regulatory measures (facing growing resistance); technological measures (cannot solve everything); economic measures (are appropriate under certain conditions but must be designed correctly); public education (important, but not enough on its own because behavior does not depend only on awareness); community action (encourages people to relate to problems close-to-home); and entrepreneurial action (using the free market to "social advantage").

To reiterate his point on education, Sterngold cited the example of energy conservation research which showed that attitudes are not well correlated with behavior. "Once people are made aware of the problem, they must be told what to do, how to do it, where to go to do it, etc." However, public education is often very impersonal; its effect can be improved by making the message personal, e.g., through follow-up in the local community.

Furthermore, unlike commercial advertising which sells tangible products, the benefits of waste reduction can be intangible and not immediately obvious to individuals. The benefits may be made to appear more immediate through the following techniques: economic incentives/disincentives (e.g., deposits); tangible products (e.g., reusable shopping bags); and "down-to-earth symbols" (e.g., packaging labels).

Crosby, L.A. and J.R. Taylor, "Consumer Satisfaction with Michigan's Container Deposit Law--An Ecological Perspective," Journal of Marketing, Winter 1982, pp. 47-60.

This article described a survey investigating consumer satisfaction with the Michigan beverage container deposit law, attitudes toward the system, and consumer reaction to retailer activities complying with the law. The survey revealed a high degree of consumer satisfaction with the deposit law. More significant for the purposes of this study, the survey found that consumers adapted to the new behaviors required under the law in about six to eight months. Few of the consumers had been engaged in recycling-oriented activities prior to the law, yet many quickly developed a "convenient behavioral repertoire." The authors suggest that developing recycling-oriented behavior follows standard skill development processes: it requires practice. In addition, the authors state that as behavior is learned and "becomes more efficient . . . it will tend to be perceived as more convenient."

Cutler, H., "Is Mandated Recycling Possible?" Solid Waste & Power, August 1988, pp. 54-57.

This article argues that mandatory source separation programs, often touted as the answer to the MSW management crisis, will not provide large-scale solutions until markets for recycled products are created. Successful source-separation programs can provide a large supply of cheap raw materials, but these materials will not be utilized unless there is demand for the products they are used to create.

The author argues that education programs which teach people about the benefits of recycling and why individuals should prefer recycled products should be the first step in any recycling program. Moreover, the author asserts that these programs could actually make mandatory recycling programs unnecessary: if demand for recycled products were strong enough, "the current non-mandatory recycling programs conducted by private parties would be enlarged to meet the new demand of the manufacturing industries, as they have historically."

De Young, R., "Clean Michigan Fund 1986-1987 Resource Recovery Education Grants: A Comparison of Selected Programs," University of Michigan, School of Natural Resources, Spring 1987.

This report compares survey data from six resource recovery education programs funded by the state of Michigan from early 1986 to mid 1987. The surveys were used to evaluate resident attitudes, behaviors, and motives pertaining to resource recovery, serving as a baseline for future programs in these communities. Residents were asked several questions, dealing with the following: importance of recycling; experience with, and plans for, recycling; and why people do, and do not, recycle. The report's following conclusions were based on results from the survey, and may be helpful to future resource recovery programs:

(1) since a large percentage of the respondents viewed recycling as important, future programs do not need to focus so much attention on changing attitudes;

(2) since a large percentage of the respondents agrees that recycling is an appropriate behavior, future programs should focus more attention on converting people's good intentions to actual behavior (e.g., helping people overcome perceived barriers [mostly due to not enough information of what to do, not enough room, and too much hassle] and promote recycling of a longer list of materials);

(3) effectiveness of future programs in increasing recycling behavior will be greatest if they concentrate on providing information (i.e., increasing familiarity with recycling behavior), rather than focusing on attitudinal, ethical or motivational issues; and

(4) future programs should focus on a range of non-monetary incentives (e.g., the effect of recycling on conserving natural resources, the benefits of recycling for a charitable organization, and the intrinsic satisfaction derived from "doing the right thing").

De Young, R., "Encouraging Environmentally Appropriate Behavior: The Role of Intrinsic Motivation," Journal of Environmental Systems, Vol. 15, No. 4, 1985-86, pp. 281-292.

This study was designed to explore the types of motivation which people feel during their daily activities towards conserving natural resources. Data came from 263 responses to a mail-back questionnaire in Ann Arbor, Michigan in 1977. Three scales were examined in detail: behavior, satisfaction, and motivation.

The study found that people derive distinct satisfaction from reuse and recycling behavior and that much of their everyday conservation behavior was intrinsically motivated, i.e., dependent upon internal goals and rewards. Intrinsic motivation was much more highly rated as a motivational factor for reuse and recycling than were extrinsic rewards. The author suggests that environmentally responsible behavior might be encouraged by helping people to discover the satisfaction they can derive from participation. That is, a program should not invest all of its effort or funding towards developing extrinsic rewards.

De Young, R., "Motivating People to Recycle: The Use of Incentives," Resource Recycling, May/June 1984, pp. 14-15, 42.

This article discussed various incentives that can be used to initiate and maintain participation in recycling programs. Both extrinsic and intrinsic incentives are examined. Extrinsically-motivated behavior is motivated by a reward, such as money, social approval, or increased convenience, while intrinsically-motivated behavior is done "for its own sake." While extrinsic incentives can be every effective in promoting recycling, the behavior established often disappears after the incentives are removed. Over-reliance on extrinsic incentives may make an individual overlook their intrinsic motivations. The author also raises the question of whether large monetary incentives are cost-effective. Intrinsic incentives tend to be stronger and more permanent than extrinsic ones, but they are far more difficult to establish. The author suggests that basing extrinsic incentives on recycling performance (e.g., percentage of waste recycled) may help, and possibly enhance, intrinsic motivation. The paper concludes that recycling programs are too often designed solely around economic incentives, and that, with combinations of extrinsic and intrinsic incentives, recycling programs could achieve more effective and enduring results.

De Young, R., "Satisfaction from Conservation Activities in North America," Environmental Conservation, Vol. 12, No. 3, Autumn 1985, pp. 259-260.

This article discusses findings from recent conservation behavior research. Two main themes are revealed from this research:

(1) There is a clear and stable structure to the satisfactions which people report deriving from daily conservation activities" (i.e., many conservation activities are no different than daily behaviors).

(2) These satisfactions are independent of satisfactions gained from material things" (i.e., non-economic satisfactions are derived from common conservation activities).

Satisfaction is categorized by the following: frugality (e.g., avoiding wastefulness, extending product life, and other activities tied to conservation), participation (e.g., participate in a community activity with a feeling of making a difference), and luxuries (research indicates that satisfaction from material benefits does not conflict with the other two types of satisfaction). That is, people can derive satisfaction from conservation. "Together, these findings suggest that environmentally appropriate activities might be made to appeal to a broad cross-section of North Americans (the well-off and disadvantaged alike) rather than just to people of a Spartan nature."

De Young, R. and S. Kaplan, "Conservation Behavior and the Structure of Satisfactions," Journal of Environmental Systems, Vol. 15, No. 3, 1985-86, pp. 233-242.

Based on results from some prior research, the authors state that satisfaction (i.e., intrinsic motivation) may be more effective than extrinsic incentives in promoting conservation behavior, based on cost-effectiveness and the durability of the behavior once the extrinsic incentive is removed.

A survey of thirty people with interest in conservation was conducted. Results of the survey included the following:

(1) People who conserve are not different from other people.

(2) A special outlook is not needed to foster conservation (several of the themes ranking conservation high also support a mainstream outlook, i.e., even though survey participants are conservationists, they were not determined to be a fringe group).

(3) There is a wide variety and commonplace nature of satisfactions (e.g., conservation ethic, money, and comfort and convenience) derived from conservation, similar to ordinary behaviors.

The authors also state that although some of the themes (e.g., comfort and convenience and modern lifestyle) may on the surface appear to conflict with conservation, "there is a potential for encouraging desired behavior patterns by emphasizing qualities such as durability and the sensual qualities of environmentally appropriate products rather than resource conservation as the bases for actions. For example, the desire for quality might be satisfied in an environmentally appropriate manner by purchasing only a few, high quality and long-lasting items rather than buying large quantities of disposable or less-durable goods."

Geller, E.S., "Applied Behavior Analysis and Social Marketing: An Integration for Environmental Preservation," Journal of Social Issues, Vol. 45, No. 1, 1989, pp. 17-36.

This paper presents several methods for integrating applied behavior analysis and social marketing techniques to produce effective action plans for increasing environmentally beneficial behaviors and limiting environmentally harmful behaviors. The author categorizes "behavior change procedures that have targeted environmental preservation" as either antecedent interventions (e.g., education, goal-setting, modeling) or consequence procedures (reinforcement or punishment).

In the applied behavior analysis section of the paper, the author discusses the necessity of identifying specific behaviors to target behavior-modification programs, and identifies the essential components of successful antecedent interventions (awareness and education sessions, verbal and written messages, modeling and demonstrations, goal-setting and commitment procedures, and engineering and design strategies), and the different types of consequence procedures (behavior response-contingent and behavior outcome-contingent). Following development of behavior change strategies, the author recommends intervening on a community-wide (and more durable) level. With larger programs, results may not be as favorable as with smaller scale efforts.

In the social marketing section of the paper, the author discusses the key elements of social marketing -- product, promotion, place, price, politics, and public opinion -- and their relevance to the design of programs which seek to change people's behavior.

Geller, E.S., "Evaluating Energy Conservation Programs: Is Verbal Report Enough?" Journal of Consumer Research, Vol. 8, December 1981, pp. 331-335.

This paper examines the stimulation of individual energy conservation behavior through workshops and home visits. Based on his and others' research, the author asserts that there is a discrepancy between self-report measures and actual behavior (i.e., a difference between attitudes and behavior regarding conservation). Workshop attendees reported that the workshops had increased their concern about the energy crisis and that they were more committed to conserving energy. However, after follow-up visits and prompts to insulate hot water heaters, install water restrictors, and lower water temperatures, there was not much difference in the application of these energy conservation techniques among forty workshop attendees and forty non-attending residents (the control group).

The author suggests that workshops, informational pamphlets and media promotion should not be relied on exclusively to promote energy conservation. Geller feels that additional motivation (e.g., a monetary reward and periodic or frequent feedback) is needed to achieve high participation rates.

Geller, E.S., "Prevention of Environmental Problems," in B. A. Edelstein and L. Michelson (Eds.), Handbook of Prevention, Plenum Publishing Corporation, 1986, Chapter 16, pp. 361-383.

The author summarizes a variety of behavior change intervention approaches to environmental protection which may be applied in any of eight target areas: population; food; land; water; energy; solid wastes; minerals; and the atmosphere. This study, however, focuses on energy conservation. Several characteristics of the behaviorist's perspective and approach are discussed.

In order for a behavior change program to be effective, target behaviors and groups must be defined. In some instances, a change can be accomplished only by a repetitive action (setting back room thermostats each night); in other instances, a single action will affect a change (purchasing a more efficient automobile), but usually at a high up-front cost.

Antecedent strategies (also referred to as prompting) are designed to increase the likelihood of desirable target behaviors or decrease the likelihood of undesirable target responses. Such strategies include verbal and written messages, awareness and education messages, modelling and demonstrations, goal setting and commitment strategies, and engineering and design technologies. Response-contingent approaches (those dependent upon performance or outcome) involve creating an incentive for the desired behavior (or disincentive for undesired behavior), educating or increasing audience awareness through media messages, providing the audience with a model of successful participation, and creation of commitment and goal-setting tactics. The effectiveness of behavior change interventions may also depend upon the consequence strategy -- creating rewards for the desired behaviors or outcomes (e.g., a monetary rebate for return of a reusable container or mention on an "environmental honor role") or creating penalties for undesired behaviors or outcomes (e.g., a speeding ticket or verbal condemnation).

The author suggests changing attitudes through behavior modification. In so doing, it may be more cost-effective to apply intervention strategies to the targeted behaviors directly rather than applying these strategies to changing attitudes and values in the hope that behavior changes will follow. However, the author states a concern of behaviorists regarding attitude formation and acceptance of behavior change -- positive attitudes are associated with incentives, negative attitudes are associated with disincentives.

To that end, frequent and specific feedback should be delivered to individuals. The author also notes that most projects have been short-term small-scale demonstrations and have ignored the "relationships that link person, behavior, social environment, and physical environment." Successful behavioral change programs must do more than modify a single behavior. The author finishes with a discussion of community-wide (community may imply national or international projects such as "Keep America Beautiful" and "Save the Whales") intervention, stating that the large-scale is the most appropriate scale for creating long-term success.

Geller, E.S., J.B. Erickson, and B.A. Buttram, "Attempts to Promote Residential Water Conservation with Educational, Behavioral and Engineering Strategies," Population and Environment, Vol. 6, No. 2, Summer 1983, pp. 96-112.

This article presents the results of a program to promote water conservation. After gauging baseline water consumption in 129 residences, researchers applied different combinations of education, feedback, and engineering (e.g., use of water conservation devices) interventions. Prior research has indicated that combinations of these strategies are more effective than individual strategies. "Significant water savings occurred following only the installation of low cost water conservation devices, although the amount of water saved with these devices . . . was much less than expected."

The major applicable finding of the study is that feedback and education (informing people about the resource and monetary savings of conservation behavior) are not, by themselves, sufficient to promote conservation. For real, lasting changes in behavior, "a supportive motivational system" must also be in effect. Apparently, people will conserve seriously only if direct, tangible rewards such as monetary savings and/or resource cost savings are provided. The author states that conservation programs should include an assessment of changes in attitude, behavior, and consumption.

Geller, E.S. and G.R. Lehman, "Motivating Desirable Waste Management Behavior: Applications of Behavior Analysis," Journal of Resource Management and Technology, Vol. 15, Nos. 2 & 3, December 1986, pp. 58-68.

Geller and Lehman define two strategies for motivating desirable behavior and reduce undesirable behaviors. These strategies can be antecedent- or consequence-oriented. Antecedent strategies take effect before the targeted behavior is to occur. They can be general prompts which do not target any specific behavior. An example of one such prompt is a packaging label such as "Dispose of Properly." However, more specific prompts are aimed at promoting one behavior (e.g., Place Recyclable Paper Here). Antecedent strategies can announce disincentives (e.g., a fine for littering) or incentives (e.g., a rebate for returning recyclables). Modeling is another antecedent strategy, demonstrating specific behaviors. Modeling includes media presentations which act out a behavior and the resulting consequence. An additional method of antecedent stimuli is a commitment strategy, where individuals make a verbal or written promise to behave in a specific manner (e.g., I will separate recyclables).

Consequence strategies take effect after a behavior has been enacted. The strategy can be positive or negative. Positive consequence stimuli reward an individual for participating in a behavior. The reward can be based on a specific response (response consequence) being performed (e.g., using a particular trash can) or it can be based on the occurrence of a more general outcome or outcome consequence (e.g., returning an established amount of recyclables to meet a goal). Negative consequence stimuli are typically laws or ordinances which outlaw or punish a certain behavior. Individuals choose to behave in a certain manner in order to avoid a negative consequence (e.g., paying a fine for littering). For a negative consequence stimuli to be effective, there needs to be a strong likelihood that the consequence will in fact follow a behavior. Typically, this is expensive because of the enforcement and administrative manpower which is required to police individual behavior. Though government and community agencies typically use negative consequence stimuli, behavioral scientists have demonstrated several reasons for their preference for positive consequence stimuli.

The authors' conclusions include:

- antecedent prompts are not effective unless the target behavior is relatively convenient and the prompt occurs at the point of desired action;

- general prompts may be cheap but are typically not capable of changing behavior;
- consequence strategies require antecedent strategies which announce the consequence of specific behaviors;
- antecedent strategies should not threaten individual freedom by demanding a behavior;
- response consequences are more specific and informative than outcome consequences and are probably more likely to be effective;
- consequence strategies must remain in effect over the long term;
- modeling strategies are often overlooked and might be effective; and
- goal-setting strategies are easy and inexpensive to implement and may be quite effective in changing behavior.

Hurst, K. and P. Relis, The Next Frontier: Solid Waste Source Reduction, Policy Paper, Gildea Resource Center, Community Environmental Council, 1988.

This report highlights source reduction as the most preferred MSW management option, though it is usually the last to be considered. The information provided is designed to educate decisionmakers, planners, public interest groups, and others on the subject. Unlike the other MSW management options, source reduction directly addresses a fundamental concern: the amount of MSW generated. The authors state that use of a common definition of source reduction will reduce confusion in the policy-making arena as well as help to chart its progress and quantify its benefits. Examples are provided of what source reduction is, and is not, barriers to its adoption, as well as recent activities by those groups taking a lead in this area.

The report also identifies source reduction policy alternatives (education and recognition resulting in voluntary action; economic incentives and disincentives; and regulation), as well as roles and/or activities of government, industry, public organizations, designers, marketing firms, and consumers. For example, consumers need to be informed which products and packages have source reduction qualities and benefits. The authors point out that significant consumer concern for the impact of their purchases on MSW disposal may serve to encourage manufacturers to respond and change their products and packages, accordingly. Recent evidence supports this: consumer interest in healthier diets has prompted marketers to promote products which appeal to this growing segment of the population.

Katzev, R.D. and A.U. Pardini, "The Comparative Effectiveness of Reward and Commitment Approaches in Motivating Community Recycling," Journal of Environmental Systems, Vol. 17, No. 2, 1987-88, pp. 93-113.

In support of their claim that prior research on conservation behavior has focused too heavily on the use of incentives, the authors discuss the significant problems related to these efforts: (1) participation rates in recycling were typically low when incentives were used; (2) many of the incentive programs were not cost-effective; and (3) incentive programs did not produced long-term and lasting changes in recycling behavior. In contrast, the authors report on their research on the use of "minimal justification techniques," i.e., "modest" rather than "highly attractive" incentives to stimulate internal motivations to recycle.

This study was conducted with fifty-nine households in Portland, Oregon to determine "the relative effectiveness of commitment and incentive techniques in promoting newspaper recycling." The study spanned eight weeks, with a five week intervention period and a three week follow-up period. Four groups of households were established:

(1) Control -- households were asked if they would participate in the project;

(2) Commitment -- in addition to being asked to participate, households were also asked to sign a commitment form;

(3) Token -- households received a token each time they recycled; and

(4) Commitment + Token -- households were provided information on the token system and, if they were interested, were asked to sign a commitment form.

Results of the study indicated that the Commitment and Commitment + Token groups recycled substantially more (based on frequency and weight) than the Control group; the same was true for the Token group, but not at the relative magnitude of the other two groups. During the follow-up period, only the Commitment and Commitment + Token groups recycled more than the Control group. On balance, none of these techniques was always more effective than the others. In addition, the results do not suggest that incentives are required. The Token group never out-performed the two Commitment groups. In fact, 75 percent of households in the Token group redeemed their tokens, while only 28 percent of households in the Commitment + Token group redeemed theirs'.

"Encouraging individuals to begin [conserving resources] by making a small commitment to recycle a household product can often times act as a catalyst for initiating and sustaining further conserving acts. Unfortunately, most social policy programs begin by making relatively large, global requests of consumers, without recognizing the importance of first establishing the basic components of these target behaviors, as well as creating situations where consumers can commit themselves to undertake these acts."

Kinnear, T.C. and J.R. Taylor, "The Effect of Ecological Concern on Brand Perceptions," Journal of Marketing Research, May 1973, pp. 191-197.

Kinnear and Taylor measured the association between ecological concern and product brand perception using statistical analysis of 500 responses from a western Ontario consumer mail survey conducted in 1972. They found that consumers who were aware of the impacts of phosphates on the environment, and other environmental problems, viewed laundry detergents containing phosphates as contributing to the pollution of lakes and streams. Low or non-phosphate detergents were seen as helping to mitigate the problem of water pollution.

Kinnear, T.C., J.R. Taylor, and S.A. Ahmed, "Ecologically Concerned Consumers: Who Are They?" Journal of Marketing, Vol. 38, April 1974, pp. 20-24.

The article examines twenty independent variables as possible predictors of scores on ecology concern indexes. Seven of the variables were socio-economic (i.e., age of wife, presence of children, education of each spouse, occupation of each spouse, and family income), twelve variables were used to characterize personality traits (e.g., rebelliousness, depression, understanding, and indifference), and one was perceived consumer effectiveness in pollution abatement. Regression analysis measured the relative importance of these variables on individual ecological concern index scores.

A profile of ecologically concerned consumers (derived from a mail questionnaire conducted in Canada and based on 500 respondents) suggests that they perceive a high consumer effectiveness against pollution, are curious and open to new ideas, are moderate in their desire to avoid personal harm (need for safety or risk aversion) and tend to earn over $15,000 (1973 dollars) per year. The results suggest that personality traits are a much better predictor of environmental concern than socioeconomic variables.

The authors suggest that public education campaigns center their appeals around a mild arousal of the need to avoid adverse personal or social outcomes (i.e., strong negative campaigns may alienate their audience), and a strong emphasis on the individual consumer's effectiveness in helping to alleviate the environmental impacts of waste disposal.

Larson, M.A. and K.L. Massetti-Miller, "Measuring Change After a Public Education Campaign," Public Relations Review, Vol. 10, No. 4, 1984, pp. 23-32.

Based on pre- and post-campaign public opinion surveys for a nine-month statewide television and radio campaign on California's garbage crisis, Californians showed a greater realization of the seriousness of the crisis. However, their participation in recycling and other "environmentally sound practices" was not on a regular basis. These results were consistent with the findings of other public information campaigns, illustrating "the weakness in relying solely upon mass-media channels for eliciting behavioral change in public awareness campaigns."

To improve the effectiveness of the public education campiagn, the state developed community-level programs to promote recycling through use of more diverse methods (posters, brochures, articles, radio, television, slide shows, and speakers). This paper reports on the Humboldt County Recycling and Anti-Littering Education Project, funded with $10,000 beginning in March 1981. In comparing pre- and post-campaign data, the authors determined that the education program was effective in influencing attitudes on littering and illegal dumping among recyclers. However, there was little overall change in attitudes on littering or illegal dumping or on recycling behavior. Potential reasons offered for this less-than-desired showing included: (1) 75 percent of the residents already recycled; (2) opportunities to recycle dwindled due to strains on the local economy; and (3) sufficient opportunities for interpersonal communication, participation, and social reinforcement were not provided. Recyclers were determined to be more likely to purchase products in recyclable packaging than were non-recyclers according to pre- and post-campaign data.

The authors also analyzed the key factors affecting recycling behavior and determined that (1) education and community involvement were positvely related to recycling behavior; and (2) age and income were negatively related to recycling behavior. Based on their findings, the authors recommended that helping the public communicate among themselves would reinforce or broaden recycling behavior.

League of Women Voters Education Fund, Recycle? In Search of New Policies for Resource Recovery, 1972.

As the solid waste burden grows, so does interest in recycling among people and members of Congress. This report helps to educate primarily individuals and communities as to what recycling is, as well as its benefits, barriers (economic and institutional) to its greater use, ways (economic and institutional) to overcome these barriers, and what lies ahead for recycling. The report stresses that markets for recycled materials are more effective to increase recycling than simply making these materials available ("the supply push approach is [like] pushing on a string"). However, demand for these materials is affected by technology, their quality, procurement specifications, and price.

League of Women Voters Education Fund, Reduce? Targets, Means and Impacts of Source Reduction, 1975.

This report cites the U.S.'s increasing MSW generation rate, decreasing landfill disposal capacity, potential environmental problems with landfills, rising disposal costs, and material shortages, as key reasons why there needs to be greater attention to source reduction. Source reduction is assessed based on its targets (durable and non-durable goods, packaging and containers, and beverage containers), approaches (tools for control [taxes and charges, deposits, bans, design regulations, and voluntary measures and education] and policies for specific products), and impacts (resources and energy, solid waste management, and the economy). Roles for industry, government, EPA, and the public are identified, all of whom need to be involved if source reduction is to be fully effective.

Mikitka, K., "Promoting Recycling: Supermarkets As Environmental Classrooms," Illinois Teacher, March/April, 1985, pp. 160-163.

The general purpose of this article is to provide subject matter and classroom activities that build upon "environmental shopping" themes. The author states that "persuasive educational and motivational strategies are needed to induce more consumers and industries to participate in recycling." She points out that stimulating the demand for recycled and recyclable materials is considered a very direct way to increase recycling.

The author states that "[t]hree key assumptions, derived from educational-marketing program evaluations, underpin the article's recommendations:

(1) Social marketing techniques can enhance educational programs.

(2) When consumers are made aware of the negative economic and environmental consequences of wasteful consumption, they are willing to support and participate in recycling programs. When provided education and point of purchase information, they favor products made from recycled materials.

(3) Program themes incorporating bywords, slogans and symbols reinforce awareness."

After discussing the implementation of a consumer education project in nine San Diego, California grocery stores (discussed in Appendix A.1), the author suggests some concepts and goals that she feels need to be included as part of in-school environmental consumer education programs. Such programs should integrate basic environmental and consumer economic principles, so that students understand the "systems relationships that influence the recycling process."

The author also points out that recycling activities are strengthened when the economic forces of supply and demand work together. She stresses the importance of teaching students about their "dual role" as consumers, that is, as suppliers of materials for recycling, and as a central force behind the demand for recycled materials. When consumers buy products and packaging made from recycled materials, they motivate manufacturers to use more of those materials. This creates a demand for recyclables, which in turn keeps their prices high enough to encourage recycling by households, organizations, and industries.

The author suggests general goals for environmental consumer education programs. She states that programs should teach students to recognize consumer recycling symbols and to understand that recycling involves continuous and interdependent production, consumption, supply and demand cycles. The article concludes with some suggested classroom activities that teach the "importance and methodology of recycling," and environmental shopping projects which can be undertaken cooperatively by home economists and supermarket managers.

Pardini, A.U. and R.D. Katzev, "The Effect of Strength of Commitment on Newspaper Recycling," Journal of Environmental Systems, Vol. 13, No. 3, 1983-84, pp. 245-254.

Past research on promoting recycling behavior has focused mainly on the use of incentives alone. In summarizing the results of some of these efforts, the authors conclude that incentives alone are deficient: (1) when the incentive is removed, the behavior change is unlikely to endure; (2) incentive programs generated low participation rates; and (3) most of these programs were not cost-effective. The authors contend that external incentives do not help to raise an individual's internal commitment to recycling. Rather, "minimal forms of external justification" to promote development of internal commitments (called the "minimal justification principle") may be more effective than "highly attractive external incentives" in promoting and sustaining changes in recycling behavior. For example, the "foot-in-the-door" technique can "be quite effective in a variety of situations where a minimal amount of pressure is first used to induce later compliance with a request that most individuals would not have otherwise agreed to."

This paper reports the results of an experiment conducted with thirty households in Portland, Oregon in 1982 to investigate the impact of three commitment techniques to promote newspaper recycling. The project included a two-week intervention period and a two-week follow-up period. Households were asked to recycle under the following conditions: (1) information, (2) minimal (i.e., verbal) commitment, or (3) strong (written) commitment (i.e., a foot-in-the-door technique). The information condition involved households receiving leaflets explaining the details of the study. The minimal condition included the same information received by the first group but also asked households to participate in the project. The strong commitment included 2the same information and question received by the second group but also asked households to sign a statement committing them to the project.

The project's findings included the following: the frequency of participation and the amount of newspapers recycled increased as did the level of commitment by households. However, once the two-week intervention was completed, only the strong commitment group continued to recycle newspapers. Three important effects resulted from the commitment techniques used:

(1) Gaining a commitment from individuals to recycle increased the frequency of their participation, as well as the weight of the material they recycled.

(2) The greater the strength of the individual's commitment to recycle, the greater the magnitude of both these outcomes.

(3) Individuals who had made a strong commitment to recycle continued to do so, even though they were no longer bound by their original commitment."

Stern, P.C., "Saving Energy: The Human Dimension," Technology Review, January 1984, pp. 16-25, 62.

The focus of this article is on energy conservation but its findings can also apply to consumer behavior issues. As starters, "[e]nergy is ... psychologically invisible whenever people cannot see the connection between the actions they take and the energy they use as a result." Tangible evidence of energy conservation (e.g., solar collectors) can matter more than intangible evidence (e.g., additional layer of insulation). Making energy use visible to people can improve the effectiveness of their conservation efforts and help them realize their savings. For example, regular feedback on energy use can be used to show the savings of energy conservation and enhance the credibility of such efforts by communicating directly with individuals and through word-of-mouth contact. The credibility of energy conservation efforts also depends on the consistency, understandability, and source of the information provided. How the information is delivered is also important: the author states that people will respond more favorably if they experience an increase in control over their environment (e.g., conservation should not be equated with sacrifice).

Individual motivations to conserve energy can sometimes be influenced by values and habits rather than by economic incentives (e.g., for some people, the times and days when appliances are used depend more on their individual commitment to conservation than to price differences). Commitment to conserve may need to build on small initial commitments, or "foot-in-the-door" techniques) e.g., distributing energy-saving devices with information pamphlets).

Tracy, A.P. and S. Oskamp, "Relationships Among Ecologically Responsible Behaviors," Journal of Environmental Systems, Vol. 13, No.2, 1983-1984, pp. 115-126.

In October 1981, 96 randomly selected adults in a Los Angeles suburb were asked about their adoption of ecologically responsible behaviors. Ecologically responsible behavior refers to actions which retard the degradation of the environment. Fifteen behaviors, including recycling, consumption of more ecologically compatible products, driving 55 mph, and using a low-flow shower head were analyzed for the following factors: 1) number of households participating; 2) positive relationship among behaviors within subcategories; 3) existence of a general relationship among all of the behaviors; and 4) relationship between attitude and behavior.

The experiment found that there was a very low rate of participation for all ecologically responsible behavior, including recycling and purchasing of more ecologically compatible goods. Participants recycled and/or consumed more ecologically compatible products in direct relationship to their concern for energy conservation (i.e., someone who is concerned about any of a wide range of ecological issues is more likely to take action towards alleviating perceived environmental problems).

The study found a lack of awareness of what can be done at the individual or household level. The authors state, "[i]ndividuals must be made aware of what they can be doing, and of which present behaviors are not ecologically responsible."

Warkov, S., "Attitudes Toward the Future: Their Impact on Present Decisions," in W.D. Conn (ed.), Energy and Material Resources: Attitudes, Values, and Public Policy, Westview Press, Boulder, CO, 1983, Ch. 7, pp. 131-143.

This article is based on a Spring 1979 telephone survey of 215 Connecticut homeowners to determine factors affecting their interest in installing (and receiving grants for) solar hot water systems (i.e., energy conservation methods). Survey results indicated that homeowner installation of solar system was significantly related to their perception of oil depletion (i.e., fear that some day there would be no more oil). Intrinsic (e.g., fulfilling one's obligations to society and future generations) and extrinsic (e.g., eventually saving money or insuring against future generations) and extrinsic (e.g., eventually saving money or insuring against future price increases) motivations were found to have an insignificant impact on homeowner interest in a solar system. However, the author points out that survey results may have been biased, e.g., the survey was not conducted in the winter, when energy use and prices are of greater concern to homeowners.

A.4 CURRENT EVENTS

American Paper Institute, no date
American Paper Institute, late 1970's-late 1980's
Association of New Jersey Recyclers, 1988
Becker, R. H., 1987
Brinkman, D.W., 1986
Chemical & Engineering News, 1988
Elliott, C., 1987
Ferrand, T.L., 1988a
Ferrand, T.L., 1988b
Harrowsmith, 1988
Jacobs, K., 1988
McMillan, T., 1988
The Michigan Recycling Coalition, 1986
The Michigan Recycling Coalition, 1984
Perrin, G., 1988
The Procter & Gamble Co., 1988
Recycling Today, 1988
Riggle, D., 1989
Sproule, K.A., and J.M. Cosulich, 1988
Stone, B., 1988
Taylor, E. H., 1988
VandenBerg, N., 1987
VandenBerg, N., 1988
Watson, 1988a
Young, R. and M. Storey, 1988

American Paper Institute, "Gray is Beautiful" Newsletter, Vol. 1, Issues 3-5, no date.

These newsletters provide information on the "Gray is Beautiful" campaign that promoted the use of recycled (gray) paperboard packaging, and environmentally conscious shopping. The newsletter, which provides factual responses to the "unfounded" claims used by manufacturers for not using recycled paperboard packaging, also contains several short articles describing the expansion of the "Gray is Beautiful" campaign to other packagers.

American Paper Institute, series of newspaper articles describing API's "Shopping for the Symbol of the '80s" and "Recycled Packaging Awareness Week" campaigns, late 1970's-late 1980's.

These campaigns involved consumers, women's clubs, grocery store chains, manufacturers, and state and local governments. Products packaged in recycled paperboard were identified by manufacturers using recycling symbols on their packages and stores having stickers placed (typically by volunteers) near the products' shelf price in participating stores. These campaigns were accompanied by media announcements. The success of these programs in changing consumer purchase decisions was not reported. These articles promoted programs which took place in Charlotte, South Carolina; Los Angeles, California; Palo Alto, California; and throughout Arkansas and New Jersey.

Association of New Jersey Recyclers, "Recycled Paper Products? Well Sometimes . . . ," Recyclenet Gazette, May 1988, p. 5.

Recycled Paper Products, Inc. has become the United States' third largest greeting card company, due in part to the popularity of its use of recycled paper. With its growth, the company has developed new product lines, many of which do not contain recycled fibers. These products are still marketed under the Recycled Paper Products trade name. Other manufacturers using recycled materials are concerned that consumers will interpret the trade name to mean that all of their products have recycled content. This case demonstrates the need for standard definitions of symbols meaning "recycled product."

Becker, R. H., "Packaging and Waste Reduction: The Need for Consumer Awareness," paper presented at the Conference on Solid Waste Management & Materials Policy, February 13, 1987.

The author describes the Pennsylvania Resources Council's Environmental Shopping Campaign, a short-lived pilot program which sought to educate consumers on ways they could lessen their generation of solid wastes. The program encouraged consumers to, among other things, buy products made from recycled materials, or products that were reusable or recyclable. The program had limited funds, but the consumers it reached responded enthusiastically. Based on this experience, as well as on survey results which indicated that the public favored recycling to reduce solid waste, but rarely went beyond verbal support, the author argues that a well-funded, well-organized consumer education program that deals with one type of packaging at a time could change consumers' purchasing habits.

Brinkman, D.W., "Used Oil: Resource or Pollutant," Chemtech, November 1986, pp. 682-684.

This article discusses the history of the reused oil industry and processes involved with the recycling of used oil. The oil re-refining industry was prosperous during the 1940s-1950s. Due to the increased use of additives in oil and economic factors (low oil prices), the industry has since declined. During the mid-1960s, the military stopped using recycled oil. At the same time, Congress enacted a bill forcing all lubricants containing any recycled material to be labeled as "made from previously used oil." The combination of these events caused consumers to assume that re-refined oil was of inferior quality.

The Used Oil Recycling Act of 1976 removed the requirement that re-refined oil had to be labeled as such. The Act publicized the fact that re-refined oils can be of very high quality. Brinkman argues that the promotion of re-refined oil needs funding.

Chemical & Engineering News, "P&G to Test Market Recycled Plastic Bottle," October 31, 1988, p. 6.

Procter & Gamble (P&G) plans to test market the first plastic bottle made from 100 percent recycled polyethylene terephthalate (PET) in 1989. The material for manufacturing these bottles is mostly from used two-liter soft-drink containers. The containers are ground and melted, and the resin is then filtered to remove impurities.

The chemical and mechanical properties of the recycled resins are said to be identical to bottles made with virgin PET. P&G is not sure whether the use of recycled resins will reduce the production costs of its bottles.

Elliott, C., "Canada's Oil Re-Refining Industry," Resource Recycling, Vol. VI, No. 2, May/June 1987, p. 26-27,42.

This article discusses the major sales barriers facing the Canadian oil re-refining industry, which also exports to the United States. Because of difficulties in selling re-refined oil in Canada, the industry sells to foreign markets (including the U.S.). Not the least of these barriers is the public perception in Canada that re-refined oils are inferior to virgin oils, despite extensive testing by the national Research Council of Canada which shows that "all properties of re-refined base oils are equivalent to, and in some applications better than, virgin base oils."

Ferrand, T.L., "Buy American, Buy Recycled," April 29, 1988a, Working Paper.

This paper is based on a presentation made during a conference on "Recycling Markets: California and the Pacific Rim," sponsored by the California Waste Management Board and the Gildea Resource Center. The author begins by discussing the "consumer sector" in recycling, meaning individual and household purchase decisions. Ferrand asserts that in addition to encouraging consumers to participate in recycling, recyclers must also work to encourage consumers to buy the finished goods made from these reclaimed materials.

The author's central point is that in order to increase demand for recycled products, the image of these products must be greatly improved. The public perception of recycled products as oftentimes inferior to those made from virgin materials must be changed. In addition, consumer education programs must be decidedly upbeat and positive; somber reminders about the growing MSW management crisis and the threat of resource depletion will not work. The author states, "We are hard to motivate with negativity, and are mostly worn out on being afraid." As an example of negatively oriented consumer education, she quotes the widely used slogan, "Use it up, wear it out, make it do or do without," and argues that this kind of approach simply does not work.

Consumer education programs should focus on the benefits that come from recycling, rather than the problems created by not recycling.

Ferrand, T.L., "Mandatory Recycling: Rhetoric Vs. Realism," BioCycle, Vol. 29, No. 7, August 1988b, pp. 54-56.

Ferrand attacks the rhetoric surrounding recycling. She also claims that existing promotional campaigns for recycling are not appealing to society. The campaigns need to provide positive associations with recycling for people rather than use negative messages. Conservation must be promoted by how it can make us "richer, more self-reliant, and secure in our economy."

Harrowsmith, "Plastics, My Boy, Plastics," July/August 1988, p. 118.

This article is Harrowsmith magazine's response to readers' criticism of a plastic magazine wrapper. They cite a 1986 West German study which found that the production of plastic grocery bags uses one-third the energy and produces less sulfur dioxide, carbon monoxide, and hydrocarbon emissions than does the production of brown paper bags. However, it takes plastics much longer than paper to degrade once they are disposed of. Harrowsmith changed their packaging in response to this criticism. They have begun to wrap their magazines in Ecostar-blended polyethylene. The starch content of this bag allows it to degrade through a combination of oxidation and biological action.

Jacobs, K., "The Design of Garbage," Metropolis, The Architecture and Design Magazine of New York, December, 1988, pp 54-59, 69-71.

This article is prominently featured as the cover page story in a magazine targeted to design engineers. The writer is the Associate Editor of Metropolis, and the presentation style is that of an entertaining and dramatic editorial. Data are presented on the magnitude of solid waste problems, and packaging and product designers are criticized for their lack of attention to the solid waste impacts of design. A few industry leaders are quoted as saying that designers must begin to be sensitive to these issues when designing products. The controversy over the term "recyclable" is explained, and new industry initiatives are described, such as the Council on Plastic Packaging and the Environment and the Packaging Coalition for Solid Waste Management.

McMillan, T., Minister of the Environment for Canada, transcript of speech at the Press Conference to Announce Details of the Environmentally-Friendly Goods Campaign, Press Release, Toronto, Ontario, June 27, 1988.

In response to public opinion surveys and consumer demands for "information on how individuals can help protect the natural environment," the Canadian government plans to initiate a labeling program to identify "environmentally-friendly" products and processes. The labeling program is slated to begin operation in January 1989, and is already receiving enthusiastic support from many business leaders and environmentalists.

Surveys show that 94 percent of Canadians believe every person must take individual actions to protect the environment. Furthermore, Canadians stated a willingness to pay up to ten percent more for "environmentally friendly" products.

The labeling program will include advisors from government, trade unions, the private sector, academia, and consumer and environmental groups, who together will review products and processes in the marketplace to determine which ones merit "environmentally-friendly" labels. In addition, a competition will be held to select a logo by which consumers can readily recognize "environmentally-friendly" goods and services. The government will provide initial financial and administrative support, but the program will ultimately be self-sustaining. Applicants for the logo will pay fees to have their products evaluated and, should they receive approval, to have them labeled with the "environmentally friendly" logo.

The Michigan Recycling Coalition, "Michigan Buy Recycled Campaign Case Study," 1986, pp. B20-B21.

This short write-up summarizes Michigan's "Buy Recycled" campaign. The campaign focuses on six products made from recycled materials:

- plastic lumber used in marinas, parks and as highway markers;
- shredded newspaper in animal bedding, and building insulation, and for erosion control;
- writing paper and greeting cards;
- retreaded tires;
- re-refined oil for industrial use; and
- paper packaging.

The first step in the Michigan program is the development of a directory of products made with recycled material. The State will not produce the directory itself, but will instead conduct training workshops for local environmental, recycling, and civic activists, along with anyone else who wants to participate. Once trained, these volunteers will meet with interested businesses and trade groups to discuss the materials most relevant to particular consumer groups. The program also includes training materials, bumper stickers, speeches, clip art, posters, and brochures to help educate and motivate consumers to recycle and purchase products and packaging that promote source reduction and recyclability.

The Michigan Recycling Coalition, "Recycled/Recyclable Packaging Design Contest: 1984-1985," 1984.

This contest, co-sponsored by four major firms (Granger Waste Management, James River Corp., Kellogg's, and Mead Paper), was designed to "encourage innovative packaging ideas that will not only meet the needs and criteria of the packaging industry, but will also maximize the use of recycled and recyclable materials, and minimize dependency on non-renewable natural resources." A cash prize was to be awarded for top packaging entries which satisfied marketing concerns (i.e., product protection, containment, information, convenience, marketability, and consumer appeal) and environmental concerns (i.e., reusability, use of recycled materials, recyclability, dependency on non-renewable natural resources, and biodegradability).

Entry forms were distributed to schools and teacher associations but no entries were returned and the prize money was returned to the co-sponsors. Project staff felt that concern for the MSW management crisis and environmental impacts of waste disposal was low in 1985. There are no current plans to rerun the contest.

Perrin, G., "In behalf of the fourth R: Recycling," The Boston Globe, September 21, 1988, p. 32.

Jeanne Bakelar, a New Jersey woman, began a campaign in 1985 which protested the use of plastic bags in grocery stores. The campaign has been expanded to include promoting the use of recyclable and biodegradable rather than plastic packaging. It is now backed by the General Federation of Women's Clubs. Bakelar stated, "The whole thing boils down to education. It's the fourth 'R' - recycling." She feels that it is up to the consumer to demand that manufacturers use recyclable and biodegradable packaging rather than plastics. (This short editorial article does not provide details of the campaign.)

The Procter & Gamble Company, materials compiled by E. A. Fox concerning P&G activities, 1988.

Procter & Gamble is marketing both a liquid detergent and a fabric softener in several European countries using a packaging refill scheme which reduces packaging by selling a reusable container of liquid detergent which may be refilled from smaller bags of concentrate and adding water. The reduction of packaging material was estimated to be approximately 85 percent of the conventionally packaged liquid detergents. Procter & Gamble expects to use the same packaging scheme, in improved form, for other products within the same market because of positive consumer response.

Recycling Today, "Canadians Host Recyclers at Wide-Ranging Conference," June 1988, pp. 54-56.

This staff article provided a brief synopsis of The North American Recycling '88 Conference. One significant theme presented at the conference was the necessity of developing a steady demand for recycled products. One speaker said that market development is "the single most important issue facing recyclers today. (It is) the last remaining barrier to a mature recycling infrastructure."

Another speaker stressed the importance of educating consumers, calling it a key to improving the success of recycling programs. Consumer education, the speaker suggested, should include labeling recyclable products as such, and teaching consumers about the true costs of "consumption without disposal planning."

Riggle, D., "Only Pay for What You Throw Away," BioCycle, Vol. 30, No. 2, February 1989, pp. 39-41.

This article summarizes the pay-per-bag trash collection programs for three communities. The author discusses the programs' collection experiences, public acceptance, effects on diversion rates (primarily from recycling), cost savings (i.e., recycling versus landfilling), and state support.

According to a representative of one of the communities' programs: "What goes on in the mind of consumers when they must repeatedly go into a store and buy the actual bags they use for their garbage and pay a price that actually reflects the cost of the service is very important. It sends a powerful message on a regular basis that waste disposal is an expensive service, and that if I reduce the amount I throw away by recycling, I will also reduce my garbage bill. It's a different kind of education than reading a flyer or going to a meeting and really seems to bring about an awareness in people of what's really going on."

Sproule, K.A. and J.M. Cosulich, "Higher recovery rates: the answer's in the bag," Resource Recycling, Vol. VII, No. 6, November/December 1988, pp. 20-21, 43-44.

This article describes the per-container system of charging households and businesses for their solid waste collection and disposal costs based directly on the number of containers set out for collection. Twelve such programs are summarized, providing information on their collection and implementation methods, containers used, fees charged, and other program features.

Stone, B., Fountain Fresh Beverages, Salt Lake City, Utah, Personal Communication, September 21, 1988.

Since 1982, the Fountain Fresh Beverage Company has been operating an innovative program which encourages consumers to reuse plastic (PET) bottles. The program works as follows. The consumer fills a two-liter plastic bottle with any of a variety of soft-drink flavors from an automatic dispenser in the store. At the register, the cashier first rings up the price for the full bottle using a Universal Product Code (UPC) label scanner, and then places a new UPC label over the original.

When the consumer returns to the store, he or she brings back the empty bottle. Attached to the soft drink dispensers are patented, automatic bottle washing units. The consumer simply places the bottle in the unit, which thoroughly washes and rinses it. The consumer then refills the bottle with soft drink and takes it to the register. The new UPC label registers a lower price than the original. No additional labels are applied after the initial purchase.

There are approximately 180 dispensing-and-washing units in operation, 60 to 70 of which are in Canada. In the U.S., the units are located primarily in the Pacific Northwest states, Florida, and some Western states. The Fountain Fresh company reports that consumers have responded positively to the program. Canadian consumers have accepted the program much more enthusiastically than have their counterparts in the United States. A representative said the Canadian response has been "unbelievable," and attributed it in large part to the high levels of environmental awareness and concern in Canada.

Taylor, E. H., "Consumer Reaction to Solid Waste Problems and Regulations," The Procter & Gamble Company, a report on work in progress, July 15, 1988.

In 1987, Procter & Gamble anticipated that there would be increasing state regulation designed to reduce MSW. The company expected that state activities ranging from taxing or banning certain packaging material to mandating trash separation and recycling would become more prevalent. Group interviews were conducted in California, Georgia, Michigan, New Jersey, and Tennessee to ascertain consumer awareness of solid waste problems and attitudes towards corrective actions. In order to gain a better understanding of household awareness, over one hundred follow-up home visits were conducted in communities in Connecticut, New Jersey, North Carolina, and Washington. The findings include:

- Consumer awareness of national and local solid waste problems was directly proportional to the level of publicity.
- Even where awareness existed, the typical response was to blame "the system." There was a great resistance to changing waste disposal practices.
- The desire for biodegradable packaging is not based on an understanding of the relative merits of degradable packaging, but rather the consumer's desire for a "panacea" to the waste disposal problem.
- The greatest weaknesses of municipal programs are communication, consistency, and dependability. The municipality's inability to get the message across to households results in confusion and lack of cooperation by households.
- Industry support may be required and industry could gain strategic market advantage from knowledge of consumer interests.
- Both industry and solid waste officials (at all levels of government) should pay more attention to what consumers are willing and able to do to solve the MSW management crisis.

VandenBerg, N., "Buying Recycled Plastic Products - Barriers to Overcome," speech given at RecyclingPlas II -- 87, June 1987.

Nancy VandenBerg's speech stresses the need to overcome barriers to buying plastic products with recycled content. She states that there is no problem meeting feedstock requirements, and that increasing demand for end products will benefit everyone. The principal impediment to increasing demand for products with recycled content is lack of availability. Most "buy recycled" programs have great difficulty finding recycled plastic products. Most manufacturers and dealers will not admit that their products contain recycled content. Randy Duncan, in Austin's (Texas) purchasing department stated,

> "Finding opportunities to buy, that's the hardest part. Paper, glass, and aluminum are easy, it's going a step beyond that's hard. The recycled content is all I ask [for]."

Manufacturers fear losing customers because labeling a product as containing "recycled material" might connote lower quality. Six barriers to increasing consumer demand and some solutions were mentioned:

- What is the definition of recycled plastic content?

  The definition must be supported by all constituencies and must be adopted quickly. Standard definitions will help to simplify the bidding for institution and government purchasing.

- How can recycled content be proven?

  Government approved certification will help overcome the doubts of skeptical consumers and prevent the creation of an over-used label such as "all natural" on food products.

- Overcome manufacturers' fear of losing customers.

  Information on recycled content should be made available to those interested in buying recycled products, including household consumers, government buyers, and the business community. Information on recycled content will also be helpful to education programs and retailers promoting purchase of recycled products.

- Publicize recycled content in products that work.

  "The prejudice against recycled content is still very real." Publicity of products with high recycled content that are already successful will increase consumer acceptance.

- Recognize existing products as well as innovations.

  Unfortunately, new products and innovations are the focus of industry and trade association publicity. The growing trend of recognizing existing products with recycled content should be supported. Eventually, trade associations may be formed by manufacturers of products with recycled content.

- Make it easy to find recycled products.

  An up-to-date computerized directory of recycled plastic products for individual and industrial consumers is needed. A product directory would be a valuable public relations tool.

VandenBerg, N., "Twelve Steps Toward Environmentally Sound Buying Habits," speech given at Office of Technology Assessment Workshop: State and Local Government Solid Waste Management, March 17-18, 1988.

The author states that getting consumers to accept and buy goods with recycled content will require some fundamental changes in American thinking. Furthermore, the message should be fashionable and the educational campaign should be well crafted to achieve the goal of long-term changes in purchasing behavior. However, educating consumers to buy these goods will not be effective if they are not available in the marketplace. As a result, policy makers and industry decision-makers must first address the following twelve problems:

- Shifting to Recycled Materials Use. A broad-scale commitment to using recyclables is needed.

- Learn from Countries using U.S. Scrap Materials about recycling industries that could be sited in the U.S. and capitalize on U.S. feedstocks. Department of Commerce should begin tracking those materials that can be recycled.

- Develop Data for Strategic Planning which currently is very difficult to gather.

- Define Source Reduction, Reuse, Recycling, Incineration, Landfill. The waste management hierarchy adopted by EPA needs to be well defined and well publicized to avoid confusion and inaccurate use of terms.

- Establish Common Definitions for Recycled Content so that recycled content labels always refer to a consistent, nationwide, minimum qualifying percentage for any given product.

- Set Purchasing Strategies to Match Waste Management Strategies. This could provide major reductions in waste generation. For example, a double-sided copier capable of reading single- or two-sided originals could cut paper use in half.

- Develop and Publicize Fundamental Formulas which not only include the purchase price but also consider avoided disposal costs available to the region.

- Re-evaluate and Improve Upon the Language in RCRA 6002. Streamlining the certification requirements for government procurements will, on a cost basis, increase the attractiveness of recycled purchases.

- Release and Publicize Federal Agency Reports and Publish Useful Bibliographies. This would be most useful if conducted according to subject area and would prevent duplication of research by different agencies.

- Redesign Shipping Strategies to Backhaul Recycled Feedstock. Transport costs could be cut if the delivery vehicles picked up recyclable materials.

- Target Materials Collections to Industries Which Limit Recycled Product Production Because of Lack of Supply. Lack of supply is often the easiest barrier to overcome but requires research to determine which industries need better feedstock supplies and what can be done to facilitate the return of post-consumer and secondary materials.

- Market Development Must Be Concurrent with Collection of Recyclable Materials or else supply and demand will always be out of balance.

Watson, T., "FSC Paper builds markets with innovative approach," Resource Recycling, Vol. VII, No. 1, March/April 1988a, pp. 30-31, 53.

This article describes FSC Paper Co.'s (Alsip, Illinois) Total Recycling program: they will purchase all the waste newspaper collected by a community if the community's newspaper publisher agrees to buy a certain amount of FSC's 100 percent recycled newsprint. FSC's recycling program represents a self-contained recycling program and is offered to communities within one to two hours of driving time from their mill. Currently, nine Midwest communities participate in the program.

Young, R. and M. Storey, Challenging the Disposable Society: An Overview of Waste Minimization Strategies, Philadelphia Recycling Office, 1988.

This paper summarizes current state waste minimization programs along the East Coast. The focus is on activities states can undertake, such as refundable deposits, packaging taxes, or prohibitive regulations, to discourage or prevent the purchase of certain packaging materials. Because of the authors' attention to legislative solutions, efforts to affect consumer behavior through education were mentioned only in passing. Education was seen to be most effective in raising citizen awareness of the need to minimize waste generation. Two publications oriented towards creating consumer demand for recyclable products were cited: the West Michigan Environmental Action Council Education Foundation's "Waste Reduction Handbook" and the Pennsylvania Resource Council's (PRC) "Environmental Shopping List." Because the PRC expects that these activities would be most effective at the local level, it is sponsoring a competition among garden and women's clubs awarding $100 to the club that is most active in changing their consumer habits. Rhode Island has already developed legislation which would require labeling to inform consumers about a product's durability and reusability. Similarly, a twelve state consortium is considering labeling requirements informing the consumer of the recyclability of plastic products. There is no discussion of the expected effectiveness of any of these programs. One section highlights industry responses such as the Coca-Cola Corporation's joint venture to produce and market the world's first refillable plastic soft drink container.

A.5 EDUCATIONAL AND RESOURCE MATERIALS

American Paper Institute, 1988
Bell, C.O. and M.M. Schwartz, 1989
Brandt, P. and M. Swanson, 1984
Browne, E.R., 1988
Chown, C. and C. Fridgen, 1986
Citizens' Program for the Chesapeake Bay, Inc., 1986
City of Berkeley, 1980s
Connecticut Fund for the Environment, 1987
Council on Economic Priorities, 1988
Dadd, D., 1984
Enterprise for Education, 1988
Environmental Action Foundation, 1980s
The Household Products Disposal Council, no date
Massachusetts Department of Environmental Management, no date
Michigan Department of Natural Resources, 1988
New Jersey Department of Environmental Protection, 1989
Oregon Department of Environmental Quality, 1980
Pennsylvania Resources Council, 1988
Seattle Engineering Department, Solid Waste Utility,
Washington Extension Service, 1980s
U.S. Environmental Protection Agency, 1980
U.S. Environmental Protection Agency, 1988b
U.S. Environmental Protection Agency, 1976
U.S. Environmental Protection Agency, 1979

American Paper Institute, "12 Facts About Waste Paper Recycling," 1988.

This pamphlet presents twelve facts which support the recycling of waste paper. These include a reduction in landfill disposal costs and the positive effect of demand for recycled paper on encouraging markets for waste paper.

Bell, C.O. and M.M. Schwartz, OSCAR's Options: A Supplementary Environmental Education Curriculum, Rhode Island Department of Environmental Management, 1989.

The lessons included in this manual are for grades 4-8 and designed for Rhode Island schools. To address the state's problems of MSW disposal, the following topics are covered: natural resources, litter, household hazardous waste, source reduction, recycling, composting, incineration, and landfills. Each topic has a list of lessons, arranged sequentially, along with suggested time allotments. Students are encouraged to become concerned consumers, to learn of the environmental consequences of their purchase decisions, and to buy products which promote source reduction and recyclability, and thereby reduce their environmental impacts.

Brandt, P. and M. Swanson, "The Environmental Consumer," 1984.

"The Environmental Consumer" is a twenty-minute automatic slide and tape series. The program begins with a discussion of the "throw away" ethic in American society. This ethic has made some raw materials scarce and has created a solid waste disposal crisis in America. The slide show suggests that the solution to the solid waste crisis is to change the existing "throw away" ethic to a conservation ethic. The presentation suggests how individual consumers can avoid products which are not recycled, recyclable, or are over-packaged. It also discusses how individuals can recycle materials and describes which materials are recyclable. Government agencies and community groups can help by developing recycling centers and separated curbside collection systems. Government agencies can also create incentives for manufacturers to produce goods that promote source reduction and recyclability.

Browne, E.R., "Teaching Kids to Teach Others," Waste Age. April 1988, pp. 154-156.

Brown claims that, "[i]t makes good business sense to teach your community about the environmentally sound aspects of modern solid waste management." The author cited programs targeted at elementary and high school students in Florida, Missouri, Ohio, and New York City that promote awareness of recycling and other aspects of solid waste management through participation in recycling drives, field trips to a disposal or recycling facility, and school science projects. Project staff in Columbus, Ohio measured success according to the level of student participation in school science projects focusing on solid waste topics. Although the current programs do not stress changing buying habits to promote the same goals, project staff felt that teaching students is always a good conduit for reaching and informing families.

Chown, C. and C. Fridgen, "Alternatives to Hazardous Household Products: You Have a Choice," Michigan State University, Cooperative Extension Service, Bulletin WM 01, December 1986.

This pamphlet discusses the dangers of hazardous household products and provides a list of alternative safe substitute products and proper disposal methods for the following products: household cleaners, aerosol sprays; automotive and paint products; and pesticides, herbicides, and rodenticides. Referral information such as additional reference materials and phone numbers and addresses of environmental agencies and groups is also provided.

Citizens' Program for the Chesapeake Bay, Inc., "Baybook: A Guide To Reducing Water Pollution At Home," Baltimore, MD, 1986.

Although targeted at people living in communities near the Chesapeake Bay and its tributary waterbodies, this guide is a reference source for anyone concerned with water pollution. The guide discusses potential sources of pollution from the home, and provides information on how to reduce or prevent it. The guide is divided into chapters on topics such as erosion control, septic systems, gardening, household chemicals (includes discussion of less toxic alternative products and appropriate disposal methods), and community action.

City of Berkeley, "Precycle. Do it Right from the Start!," Berkeley, California, 1980s.

"Precycle" is described as "[a] new, perhaps revolutionary, way of thinking about waste." It draws a direct link between what we buy and what we throw away, and stresses source reduction through purchase decisions made at the store. Examples of precycling include choosing products carefully, being selective on packages, avoiding disposables, buying in bulk, and reusing and repairing items. Locations of collection points for recyclables are also listed.

Connecticut Fund for the Environment, Don't Throw This Away!, 1987.

The coalition prepared a booklet which summarizes statistics about solid waste and recycling, provides advice on how to reduce waste volume and toxicity by changing purchase decisions, and tells where and how to recycle household wastes.

Council on Economic Priorities, "Shopping For A Better World," New York, NY, 1988.

A pocket reference guide designed for consumers to carry with them while shopping. Includes a section called "Shopping For A Cleaner World," which rates companies in terms of the environmental safety of their products and/or manufacturing practices. Companies using modern pollution controls, practicing resource recovery, eliminating hazardous ingredients, or using more recyclable and/or biodegradable packaging materials (or combinations of these activities) are rated and named.

Dadd, D., Nontoxic and Natural, Jeremy P. Tarcher, Inc., Los Angeles, CA, 1984.

A book rating over 1,200 brand-name items for nontoxicity, and suggesting over 400 safe, inexpensive alternatives to commercial products. Covers cosmetics, food, cleaners, pesticides, office supplies, and building materials. Includes a bibliography, a directory of manufacturers, importers, distributors, and mail-order sources.

Enterprise for Education, Inc., Hazardous Wastes from Homes, 1988.

This color booklet provides a brief history of the creation, introduction, and widespread use of household chemicals. The booklet outlines the dangers of many common chemicals, and gives instructions on the safest ways to dispose of virtually all household chemicals. It advises consumers to change their buying habits to avoid purchasing dangerous products, and to recycle their hazardous wastes. It also supplies general guidance and suggestions for implementing a community household hazardous waste collection and disposal program.

Environmental Action Foundation, "SWAP: Solid Waste Alternatives Project," 1980s.

"The goal of the Solid Waste Alternatives Project is to encourage states and communities to implement successful waste reduction programs that maximize source reduction, reuse, remanufacture, recycling and composting." This brochure discusses strategies to encourage greater levels of these waste reduction measures as well as actions individuals can take in their purchase and use of products, as well as in their everyday lives.

The Household Products Disposal Council, "Disposal: Do It Right. Managing Household Wastes," Washington, DC, no date.

This booklet discusses the potential hazards of, and proper disposal methods for, common household products. It includes a section on how communities handle different kinds of household wastes, a checklist of "do's and don't's" for household hazardous waste disposal (e.g., don't pour any wastes into storm drains), recommended disposal instructions for household products, and information on setting up a community household hazardous waste collection day.

Massachusetts Department of Environmental Management, "Household Hazardous Wastes," no date.

This pamphlet describes the environmental hazards of careless storage and disposal of many common household products. It includes a list of benign and inexpensive alternatives to such products as oven cleaners, roach poisons, and silver polish. The pamphlet also encourages consumers to change their buying habits so as to avoid purchasing environmentally hazardous items.

Michigan Department of Natural Resources, "Buy Recycled Products: They're Worth Our Environment," 1988.

The Michigan Department of Natural Resources, with funding from the Clean Michigan Fund Program, has produced a series of pamphlets under the title, "Buy Recycled Products. They're Worth Our Environment." The pamphlets begin by presenting information about the solid waste management crisis in Michigan. This information includes how much solid waste is generated in Michigan, where and how the waste is disposed of, and the potential problems associated with disposing of waste in these ways (e.g., ground water contamination from landfills and air pollution from incineration).

The pamphlets suggest that recycling is one way individuals can help solve Michigan's solid waste crisis. In order to increase the demand for recycled products, the Michigan Buy Recycled Program concentrates on encouraging the purchase of recycled paper and paper packaging, recycled plastic, retreaded tires and re-refined automotive oil. The pamphlets describe the types of products which are available in each of these categories and dispute some of the common myths concerning recycled products' quality and price. There is also a smart shopper's guide to source reduction.

New Jersey Department of Environmental Protection (NJDEP), Here Today, Here Tomorrow ... Revisited: A Teacher's Guide to Solid Waste, Division of Solid Waste Management, 1989.

This is a manual developed and designed for New Jersey students and teachers in grades 4 through 8, and written by New Jersey teachers and solid waste management professionals. Activities in the manual are designed around New Jersey solid waste management issues, intending to increase student (and teacher) awareness and knowledge of the subject. Students and teachers are also asked to participate actively (e.g., through their roles as consumers) in solving the state's solid waste dilemma. Student activities are described by individual objectives, subject areas, skill identification, materials needed, study procedure, study extension possibilities, and the solid waste component(s) (source reduction, recycling, resource recovery, and landfilling) to which the activities are related.

Oregon Department of Environmental Quality, "Packaging," 1980.

This flyer discusses the uses of packaging as well as what makes some packaging excessive. It lists alternatives for consumers and provides a self test to determine how socially conscious a consumer is.

Pennsylvania Resources Council, "Become an Environmental Shopper: Vote for the Environment," 1988.

These materials ask consumers to think about the environmental impacts of their purchasing decisions, and to become "environmental shoppers" by learning the four R's: reduce the amount of waste produced; reuse as much as possible; recycle the recyclables; and reject (i.e., don't purchase) over-packaging and products hazardous to the environment. The brochure offers an environmental shopping guide which lists products that are packaged in recycled/recyclable packaging. Information on how the brochure was distributed and its effectiveness is contained in the Ruth Becker speech (1987) contained in Appendix A.4.

Seattle Engineering Department, Solid Waste Utility; Washington Energy Extension Service, "Cutting Down On Garbage," Seattle, WA, 1980s.

This booklet provides information on environmental shopping, reuse, recycling, composting, other ways to reduce MSW disposal, and information on the hazards of common household products.

U.S. Environmental Protection Agency, Let's Recycle! Lesson Plans for Grades K-6 and 7-12, SW-801, 1980.

In 1975, EPA provided financial and technical assistance to Somerville, Massachusetts to determine the feasibility of residential source separation of recyclables. A key component to the program's success was the education campaign used for residents and students. The lesson plans included in the manual are based on those used in Somerville; they are designed to inform students of the environmental impacts from MSW, the benefits of recycling (and reuse), and how to participate in recycling (and reuse) activities.

U.S. Environmental Protection Agency, "Recycle," EPA/530-SW-88-050, October 1988b.

This brochure describes the MSW problem and the role of recycling in reducing the reliance on landfills and incinerators, saving on disposal costs, protecting health and the environment, and conserving natural resources. Information is also provided on what recycling is, and how to participate in it, as well as how to be a smart shopper.

U.S. Environmental Protection Agency, "Waste Not, Want Not," Washington, D.C., 1976.

This one-page flyer discusses how households can help reduce the amount of packaging used. It describes in simple terms how households can minimize, shop for, reuse, discard properly, compress, and recycle their packaging wastes.

U.S. Environmental Protection Agency, "What You Can Do to Recycle More Paper," 1979.

This pamphlet discusses the benefits of recycling in conserving resources and protecting the environment. It is pointed out that demand by individual consumers and bulk users for recycled paper is necessary if wastepaper is to be used to make new paper. There is lengthy discussion of the various roles for consumers and households (e.g., ask for it, buy it), citizens (e.g., write about it, participate in it), students (e.g., ask for it, study it), teachers (e.g., write for it, teach about it), and employees (e.g., ask about it and for it), to increase the demand for products made of recycled paper.

Appendix B

ORGANIZATIONS AND INDIVIDUALS CONTACTED

Telephone Interviews

Informal telephone interviews were conducted with members of industry associations, individual companies, government organizations dealing with recycling programs, environmental coalitions, and numerous consultants and other experts.

Industry associations were asked about the types of products and packaging their members produce, how consumers have responded to the promotion of products and packaging that promote source reduction or contain recycled materials, whether the industry makes any efforts to create a positive image for recycled products and packaging or downplays that they are recycled, and their opinions on the appropriate roles for the public and private sectors in promoting recycled products and packaging.

Members of government organizations were asked for information on projects currently underway or planned for the future, and for their opinions of the proper roles for government and industry in stimulating demand for products and packaging that promote source reduction or recyclability.

Individual companies were asked essentially the same questions as were industry associations, except that special attention was paid to the specific details of each company's situation and products and packaging.

The consultants, experts and coalition members were asked for any information they had, as well as for their assessment of the current level of consumer awareness about products and packaging that promote source reduction or recyclability and their opinions about the essential elements of a successful education program.

The following is a list of the primary contacts made during telephone interviews.

Industry Associations:

Aluminum Association
American Retreaders Association
American Paper Institute
Food Marketing Institute
Glass Packaging Institute
Institute of Scrap Recycling Industries
New Jersey Food Council
Society of the Plastics Industry
Tire Retread Information Bureau

Government:

California Waste Management Board
Environmentally Friendly Products Campaign of Canada
Illinois Dept. of Energy and Natural Resources
Maryland Energy Office
Michigan Department of Natural Resources
Ministry of the Environment, Canada
Minnesota Pollution Control Agency
Minnesota Waste Management Board
Pennsylvania Resources Council
Recycling Council of Ontario (Canada)
Rhode Island Department of Environmental Management
Rhode Island Solid Waste Management Corp.
U.S. Congress Office of Technology Assessment
Wisconsin Department of Natural Resources

Companies:

Ahern and Heussner
American Demographics Magazine
FSC Paper
Metropolis Magazine
Packaging Magazine
The Procter & Gamble Company
The Recycled Paper Company
Recycled Products Guide
Rubbermaid
Turtle Plastics
World Waste Magazine

Experts and Coalitions:

American Recycling Markets
Bentley College
Columbus Clean Community
Consumers Union
Council on Economic Priorities
EcoNet/PeaceNet
Environmental Defense Fund
Ferrand Associates
Markets for Recycled Products, New York City
New Alternatives
New York City Environmental Action Coalition
Overseas Marketing Exchange
People Technologies
Public Management Consultants
Reed College
Resource Conservation Consultants
San Diego Ecology Centre
San Diego State University
Social Investment Forum
Society of Consumer Affairs Professionals

Technical Assistance Research Programs Institute
University of Michigan
University of Pennsylvania
Virginia Polytechnic Institute and State University
Worldwatch Institute

Appendix C

MATERIALS IN THE MUNICIPAL SOLID WASTE STREAM AND SELECTED PRODUCTS AND PACKAGING WHICH MAY HELP TO MITIGATE THE MSW MANAGEMENT CRISIS

This appendix provides a summary of products and packaging and practices that can help reduce the MSW problem. MSW is defined by U.S. EPA (1989) as referring "primarily to residential solid waste, with some contribution from commercial, institutional and industrial sources." The first section discusses products and packaging that promote source reduction and recyclability. The second section reviews several environmental shopping guides that can help consumers modify their purchasing habits and become more conscious of the environmental impacts posed by common household products and packaging.

Summary of Products and Packaging

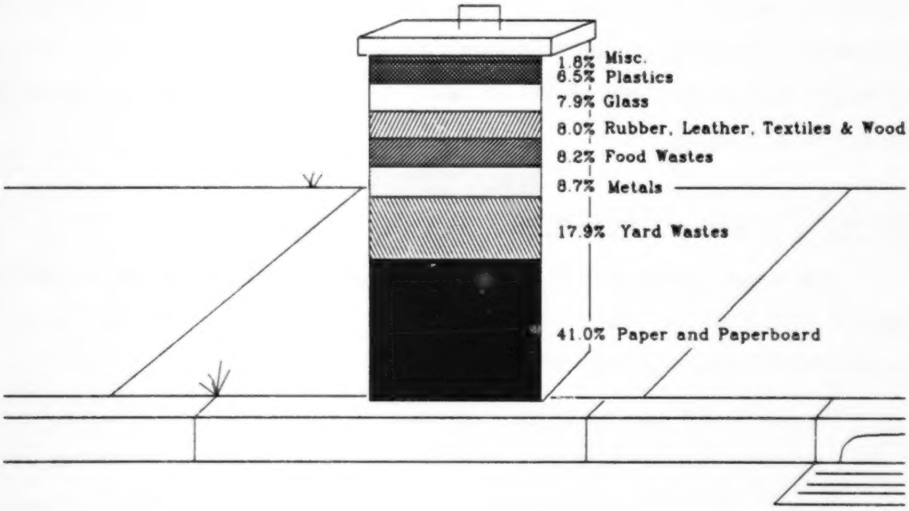
The study generated a list of the types of household consumer products and packaging that promote source reduction and recyclability. The list is not exhaustive, and no brand names are provided.

Products and packaging that promote source reduction include redesigned half-pint milk cartons (use less paper), durable products, reusable products and packaging containers, and non-toxic alternatives to household products and chemicals. Products that are repairable also contribute to source reduction in that worn components, rather than the entire product, are replaced.

Products and packaging that promote recyclability include: paper, glass, ferrous metals, aluminum, plastics, rubber, waste oil, textiles, yard wastes, and municipal sewage sludge. The most common reusable items found in households are containers such as returnable bottles, durable packaging, and boxes. In addition, numerous non-toxic or low-toxicity pesticides are available to consumers. The following materials, discussed in order of their contribution to the MSW stream (see Exhibit C-1), are considered recyclable. It is important to note that until both the technology to reclaim and reprocess those materials and the market for reclaimed materials exist, a material cannot be considered recyclable.

Exhibit C-1

Recyclable Constituents of the MSW Stream



(U.S. EPA, 1988a)

Paper makes up 41 percent of gross discards of the MSW stream. On average, about 22 percent of used paper is recovered (USEPA, 1988a).

- **Recyclable** paper products include newsprint, office paper, computer paper, magazines, and cardboard. The specific paper products accepted for recycling often vary with recycling centers. The paper recycling process can be hampered by certain items, including envelopes with cellophane "windows", and peel-off note paper ("stick-on notes") backed with polyvinyl acetate adhesive.

- **Recycled** paper products include gray cardboard, high-grade office paper, xerographic and laser printing paper, mixed paper, newsprint, photographic paper, corrugated cardboard, gypsum, wallboard liner, cellulose insulation, tissue products, and "agropaper", a soil mulch.

Yard wastes are 17.9 percent of gross discards of the MSW stream (USEPA, 1988a). Yard wastes can be composted and sold as a soil enhancement or mulch. Because yard wastes constitute such a large share of the total MSW stream, and because composting them is relatively simple and avoids the cost of disposal, communities are increasingly turning to composting yard wastes to help reduce the amount of MSW destined for disposal.

Glass makes up 8.2 percent of gross discards of the MSW stream. Of this amount, approximately 8.5 percent is recovered (USEPA, 1988a).

- **Recyclable** glass products include all glass containers such as bottles and jars. Most non-container glass products, such as dishes and plate glass, are not accepted at recycling centers because they are made of different materials than are bottles and jars. In addition, certain specialty glass products are not recyclable. These include safety glass, which is laminated with a plastic film, and heat-resistant (Pyrex) glass, which is extremely difficult to melt for re-molding. Glass is an extremely efficient material to recycle, because it can be melted and re-molded into new containers with no loss: one pound of discarded glass can be recycled into one pound of new glass (Glass Packaging Institute, pamphlet, no date).

- **Recycled** glass products include new glass containers, fiberglass insulation, aggregate substitutes (fill), foam insulation, and "glassphalt," a paving material.

Ferrous Metals compose 7 percent of gross discards of the MSW stream. Less than 4 percent of ferrous metal discards are recovered (USEPA, 1988a).

- **Recyclable** ferrous metal products include a wide variety of scrap metal items. Household ferrous recyclables include steel cans, automobiles (bodies, engine blocks), and major appliances.

- **Recycled** ferrous metal products encompass the same wide range as do the recyclable products. For example, the steel from used appliances can be recycled into sheet steel, and engine blocks can be recast into any number of items, including new engines.

Aluminum makes up 1.5 percent of gross discards of the MSW stream, of which 25 percent is recovered (USEPA, 1988a).

- **Recyclable** aluminum products include cans, and a wide variety of other products, ranging from aluminum engine blocks to miscellaneous scrap. Like glass, aluminum is an efficient material to recycle. It requires much less energy to recover and recycle aluminum than to mine and refine the bauxite ore for virgin metal (Aluminum Association, personal communication, 1988).

- **Recycled** aluminum products include much more than just beverage cans. Virtually every product made from aluminum has at least some recycled aluminum in it. The Institute of Scrap Recycling Industries (personal contact, 1988) has stated that recycled aluminum performs better than virgin metal in die casting.

Plastics make up 6.5 percent of gross discards of the MSW stream. Approximately one percent of discarded plastics is recovered (USEPA, 1988a).

- **Recyclable** plastics include discarded polyethylene terephthalate (PET) bottles, high-density polyethylene (HDPE) milk and juice jugs, and polyvinyl chloride (PVC).

- **Recycled** plastic products vary depending on the type of plastic that is recycled. PET bottles are recycled as: fiberfill for coats and sleeping bags, rigid plastic foam insulation, woven or spun geotextiles/geofabrics (used in erosion control), continuous filament yarns, carpeting, garbage bags, and garbage cans. High-density polyethylene is made into: drain pipes, pallets, playground equipment, plastic lumber, plant pots, hoses, urethane foam insulation, and molded plastics (e.g., shower stalls). Polyvinyl-chloride is recycled to make: urinal screens, floor mats, automobile battery casings, and tire traction mats.

Before they can be recycled into new products, discarded plastic items may need to be sorted by resin types (i.e., PET separated from PVC, etc.). In an effort to facilitate such container sorting, and thus to increase plastic recycling, the Society of the Plastics Industry has recently designed a Voluntary Plastic Container Coding System. Under the system, which began in July 1988, participating container manufacturers will imprint symbols that identify resin types on the bottom of all plastic bottles with a capacity of 16 ounces or more, and on other plastic containers with a capacity of 8 ounces or more. It is expected that most plastic bottles will be coded by mid-1991.

Rubber and Leather make up 2.5 percent of gross discards of the MSW stream (USEPA, 1988a). A small amount of discarded rubber (less than 3 percent of the rubber and leather) is recycled into products such as irrigation hoses and automobile retreads.

Textiles comprise 1.8 percent of the MSW stream. An extremely small portion of the textile discards is recycled (USEPA, 1988a). Waste wool and cotton are used in recycled cloths (industrial wiping cloths), and discarded polyester is recycled as mattress pads and carpeting.

Municipal wastewater treatment sludge comprises 1 percent of gross discards of the MSW stream. Currently, approximately 41 percent of all sludge generated is sent to municipal landfills, while 25 percent is applied to land as a soil amendment, either directly or after composting.

Waste Oil can be re-refined for use as a lubricant. Waste oil can also be burned as a fuel, but this practice produces emissions of heavy metals and other contaminants unless adequate pollution controls are used. Despite negative public perceptions about its quality, re-refined oil has been shown to be as good as virgin oil (see Elliot, Appendix A.4).

Shopping Guides

State and local governments as well as some private companies and non-profit organizations now offer environmental-shopping guides. These guides range from lists of products and packaging made from recycled materials, to brand-name evaluations of the toxicity of common household products and suggestions for non-toxic alternatives. The guides also include lists of companies that practice source reduction, utilize state-of-the-art pollution controls, eliminate toxic materials in their production processes, and use more recyclable materials in their packaging. Some examples of these kinds of guides are: Shopping For A Better World, by the Council on Economic Priorities, Nontoxic & Natural, written by Debra Lynn Dadd, and Recycled Products Guide, by Recoup Publishing (available March 1989).

Consumer shopping guides are useful for several reasons. First, and most obviously, these guides help consumers make environmentally-conscious purchase decisions by providing them with basic information about the products on the market. Second, because they make environmental shopping less confusing, the guides encourage consumers to modify their purchase habits. Third, by showing consumers the social-cost differences between products with similar or identical functions, these guides may help consumers recognize that by choosing carefully what to buy, they can influence which products are manufactured and sold.

There are also numerous guides available that provide information on reducing the amounts and toxicity of wastes leaving the home. Some guides, such as the those available from the Environmental Action Foundation (1980s, 1976) as part of its Solid Waste Alternatives Plan (SWAP), the Seattle Engineering Department (1980s), the Michigan Department of Natural Resources (1988), the Pennsylvania Resources Council (1988), or from the U.S. EPA (1988b, 1986) focus on ways to reduce MSW. Others guides, such as those from the Citizens Program for the Chesapeake Bay, Inc. (1988), and Enterprise for Education (1988), emphasize the pollution hazards posed by many common household products such as cleaners, polishes, disinfectants, motor oil and antifreeze. These guides also discuss safe ways to dispose of household hazardous wastes and encourage the use of non-toxic alternatives.